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INDIAN AGRICULTURAL
RESEARCH INSTITUTE, NEW DELHI .

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192524

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THE JOURNAL
OF THE
ROYAL AGRICULTURAL
SOCIETY OF ENGLAND

VOLUME 92



(BEING THE NINETY-SECOND VOLUME ISSUED SINCE THE
FIRST PUBLICATION OF THE JOURNAL IN 1839)

PRACTICE WITH SCIENCE

192524
LONDON:

JOHN MURRAY, ALBEMARLE STREET

1931

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" 3. 1842 ..	" III. " I. (viii.), II. (ix.), & III. (x.)	" 48. 1887 ..	" XXIII. " I. (xv.) and II. (xvi.)
" 4. 1843 ..	" IV. " I. (xi.) and II. (xii.)	" 49. 1888 ..	" XXIV. " I. (xvii.) and II. (xviii.)
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" 7. 1846 ..	" VII. " I. (xvii.) and II. (xviii.)	Vol. 51. 1890 ..	Vol. I. Parts I. (i.), II. (2), III. (3), & IV. (4)
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" 9. 1848 ..	" IX. " I. (xxi.) and II. (xxii.)	" 53. 1892 ..	" III. " I. (9), II. (10), III. (11), & IV. (12)
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" 44. 1883 ..	" XIX. " I. (xxxvii.) and II. (xxxviii.)	" 90. 1929 ..	Issued as an Annual Volume in paper covers.
" 45. 1884 ..	" XX. " I. (xxxix.) and II. (xl.)	" 91. 1930 ..	Issued as an Annual Volume in paper covers.
		" 92. 1931 ..	Issued as an Annual Volume in paper covers.

(The numerals within brackets indicate the numbers as printed on the several Parts of each Series.)

JOURNAL

OF THE

ROYAL AGRICULTURAL SOCIETY OF ENGLAND

THE WORK OF THE HARPER ADAMS COLLEGE PIG-FEEDING EXPERIMENTAL STATION, 1926-1931.

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EQUIPMENT AND METHODS.

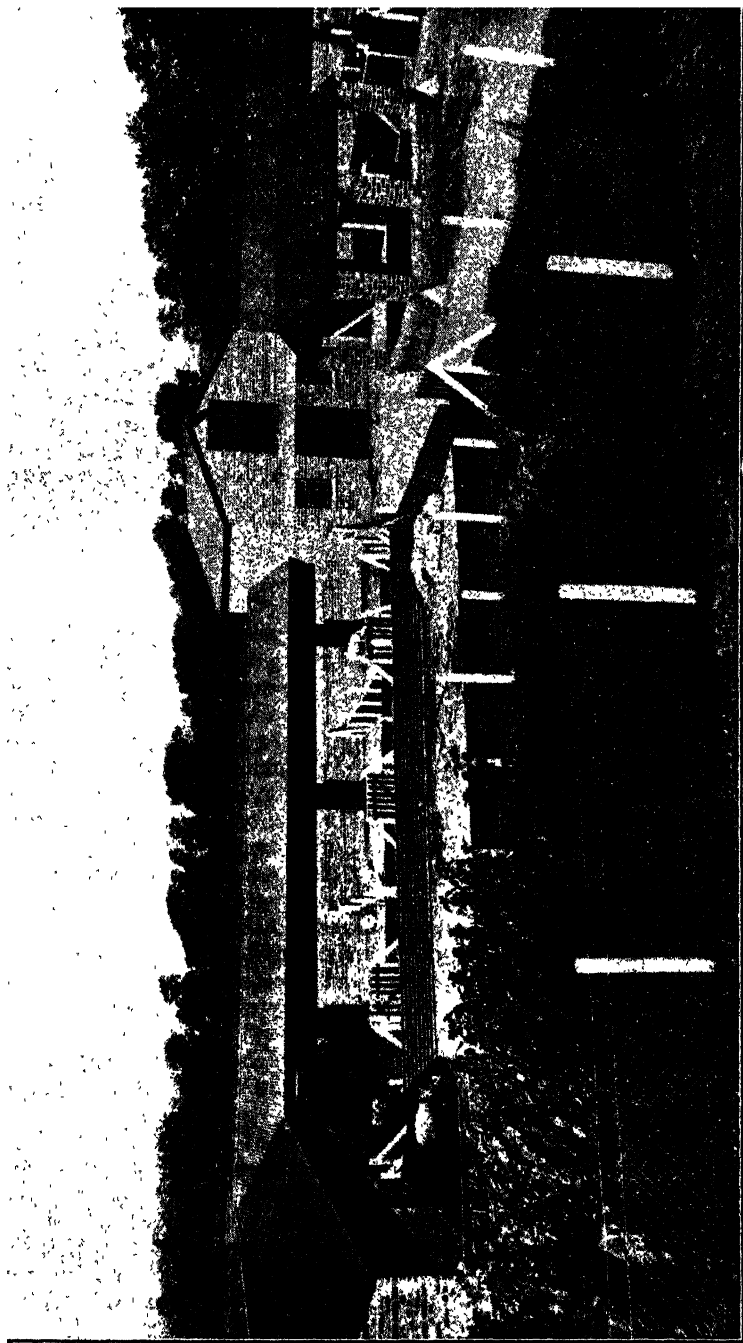
THE pig-feeding experimental station at the Harper Adams Agricultural College was established in February, 1926, as part of a co-ordinated scheme of pig-feeding research centring in the two Animal Nutrition Research Institutes at Cambridge and Aberdeen. Its primary purpose is to undertake co-operative experiments with other centres on feeding problems that are undergoing more intensive study at the two Research Institutes, but other matters are dealt with in so far as the facilities will permit. The experiments are strictly practical in character and relate entirely to indoor feeding, questions of outdoor management being left to the corresponding experimental centre at Wye.

In order to secure a supply of pigs of reasonably uniform type for the experiments, a small breeding herd of ten to twelve Large White sows and gilts, with a Large White boar, is maintained, but to keep the available accommodation fully occupied it is frequently necessary to purchase stores in the local markets. These are mostly crosses of Large White with Large Black, Saddleback, or Middle White.

For the purposes of the work a complete new piggery was erected in 1925-26, comprising eight breeding-pens and twenty feeding-pens, together with food stores, weighing-room, exercise yards and paddock. The building is in the form of an open quadrangle facing south, with the food store in the middle of the long side. The whole of the space enclosed by the three wings of the building is concreted, and divided up into a number of small exercise yards, with a covered dungstead situated in the middle. The number of yards is such that a separate yard can be provided for each experimental Lot. Two larger yards are available for the breeding stock, which also have access to a small grass paddock and to one of the farm pastures.

The front of the building is formed by a wall 5 feet high on which rest posts carrying the roof at a height of 7 feet at the eaves. The 2-foot space above the wall was left open until last year, when it was filled in with sliding glass sashes. Behind the front wall is the feeding passage running all round the inner face of the building. The roof is of thin galvanised sheeting, this material being used on grounds of economy, but experience has shown that a more substantial and cold-proof covering ought to have been provided.

Each pen is 12 feet deep by 8 feet wide, and is provided at the back with a brick bed running the whole width of the pen and raised about 3 inches above the rest of the floor, which is concrete, with a fall towards a drainage gully just outside the door. Over the brick beds are wooden bearers resting on the partition walls, and forming a platform on which the litter straw



EXPERIMENTAL PIGGERY, HARPER ADAMS COLLEGE.

4 *Harper Adams College Pig-feeding Experimental Station.*

is stored and under which the pigs can lie snugly. Each feeding pen accommodates five or six pigs up to bacon weights, and two or three such pens usually form one experimental Lot, that is, a unit of ten to eighteen pigs on each separate ration tested. Loose galvanised troughs of the Norfolk pattern are used for feeding, these being lifted on to the partition walls after each feed.

The food preparation room, 24 feet by 19 feet, is centrally situated, and carries an upper floor over the greater part of it, on which the reserve supplies of food are stored.

The meal foods are given in the form of slop at two or three feeds daily; a small allowance of green food is given each day, and the pigs are allowed short periods of exercise in concrete-paved open yards. Throughout the whole of the work careful records are kept of food consumption, rates of growth, feeding costs and many other data that have a bearing upon economy of production.

At one end of the piggery the new building is joined on to an older building in which the weighbridge is situated, so that the pigs can be driven straight down the passage on to the weighbridge.

The general procedure followed in carrying out experiments is as follows. After weighing the pigs intended for the experiment they are divided carefully into the number of Lots required in such way as to ensure that the Lots shall be as closely comparable as possible, attention being paid to weight, age, sex and breeding (where known). There is inevitably a fair range of size within each Lot, but the distribution is so made that a pig of any size and age in one Lot is matched by a similar pig in each other Lot. In dividing a Lot between the two or three sties in which it is to be housed, the bigger pigs are put together and similarly the smaller pigs. After allowing a few days for the pigs to settle down they are weighed (to the nearest $\frac{1}{4}$ lb.) individually on each of three consecutive days. The average of the three weighings is then taken as the weight of the pig on the middle day which counts as the first day of the experiment. A similar procedure is followed at the end of the experiment. During the experiment the pigs are weighed once every week. The weighings are always made before the morning feed, that is, after the longest period of fasting.

One day's supply of food is prepared at a time for each Lot, each constituent meal of the ration being weighed separately into the mixing tub reserved for that Lot. The necessary water to be mixed with the meals is measured roughly by buckets. The day's supply for the Lot is divided between the two or three pens composing the Lot roughly in proportion to appetite, the bigger pigs getting a little more and the smaller a little less than

the average. The amount supplied is based upon what the pigs will clean up in about 20 to 30 minutes. No attempt is made to keep all the Lots at the same level of food consumption, as this would penalise the Lots on the better rations. The criterion by which the results should be judged is therefore not so much the actual live-weight gains recorded as the weight of food used to produce 1 lb. live-weight gain. This can only be given, of course, for the Lot as a whole, since the individual appetites within the Lot vary.

In order that data over as long a period as possible may be obtained the pigs are all fed up to bacon weights. At slaughter the carcass weights of most of the pigs are obtained and notes made on the quality of the meat. In many of the experiments further information has been obtained as to the quality of the cured bacon and hams.

PROGRAMME OF EXPERIMENTS.

Pig feeding is traditionally associated with the utilisation of milk and dairy by-products, and no system of feeding has yet been devised that is capable of yielding better results than those obtainable from the old-fashioned ration of cereals supplemented by milk, skim milk or buttermilk—these being followed closely in value by whey. It is common knowledge, however, that the cereals alone, without the dairy supplement, give very unsatisfactory results; so much so indeed, that it is still widely held that pig feeding can rarely be profitably practised except in association with dairying. This view, however, is obviously only valid if no effective substitute for milk can be found.

When we compare the chemical composition of the cereals with the requirements of the young, growing pig we note at once three deficiencies that require to be made good, *viz.*, vitamins (A and D), proteins, and certain mineral ingredients (notably lime and salt). Milk is well equipped with regard to these items, so that the advantage it confers on the cereal diet is not difficult to explain, although this explanation probably does not quite cover the whole value of the milk.

In searching for milk substitutes, therefore, our attention has to be directed in the first place to materials richer than the cereals in proteins and the required minerals. The vitamin supply is not difficult to safeguard, especially as the vitamin requirements of the pig appear to be very low. For reasons that need not be discussed here it seemed probable that the most efficient milk substitutes might be found in other animal products, such as fish meal and meat meal, that are rich in proteins and minerals, and both experimental work and practical experience have abundantly demonstrated that with these materials rates of growth can be secured almost equal to those obtainable

with milk. The same applies to dried yeast, but with other vegetable foods rich in protein, such as beans, peas, linseed cake, &c., the results obtained prior to the last few years were distinctly less satisfactory—the fact being long overlooked that these foods, though rich in proteins, are little better equipped with the necessary mineral ingredients than the cereals themselves. These vegetable foods are normally so much cheaper than the animal foods that there was obviously considerable advantage to be gained from their use if they could be made to give as good results as the animal foods.

This was roughly the position when the Harper Adams experiments commenced, and one of the chief lines of work of the Station throughout the past five years has been the study of this problem, using mainly extracted soya-bean meal as a typical protein-rich vegetable food.

As regards the cereal foods themselves the pig feeder has been closely tied to wheat offals, barley and maize. Experiments have therefore been carried out to test whether tapioca flour could serve as an effective substitute for barley or maize when prices made its use attractive.

Similarly the possibilities of dried sugar-beet pulp and of ground oats as substitutes for sharps have been studied.

One of the most interesting lines of experiment has been the study of the mineral supplement required along with rations of cereals and soya meal.

Apart from these studies of the various ingredients of the ration experiments have also been carried out to obtain information on the economic returns obtainable by the use of milk, separated milk, and potatoes in pig feeding.

A number of miscellaneous points, such as water-supply, the value of cod-liver oil, &c., have also come within the scope of the experimental work of the Station. Apart from the experimental work proper, tests have also been made to obtain guidance as to the degree of accuracy that might be claimed for the experimental results.

In the following detailed account the experiments are not dealt with in chronological order, but rather in relation to the subjects dealt with, as this permits of a clearer presentation of what has been accomplished.

RELIABILITY OF RESULTS.

It is familiar experience that individuals vary in their capacity or growth under identical treatment. If two Lots of ten pigs each, all of the same initial weight and similar breeding, were fed exactly alike it would not follow that they would give precisely the same average results. The more variable the initial weights of the individual pigs within the Lots, even though the

average weight per Lot be the same, the greater is the chance of variation in the final results, even though both Lots have been treated alike. Before we can interpret the results of an experiment, therefore, it is necessary that we should have some guidance as to the allowance that must be made for "normal variation," and this can only be determined by tests carried out exactly on the lines of the experiment, but with every Lot receiving the same treatment. Two such tests have been carried out at the Harper Adams Station, and the results are summarised below.

First Normal Variation Test.

(August 2 to December 13, 1928.)

For this test thirty pigs were available, which were run as three Lots of ten pigs each, housed in six sties. The rations were the same for all and consisted of mixtures of sharps, barley meal, tapioca flour, extracted soya meal, and minerals. All details of treatment were the same for each Lot, as were the total quantities of food consumed.

Initial Weights.

				Range of Variation.		Average.
				lb.	lb.	lb.
Lot I	.	.	.	42.5	to 88.75	67.37
" II	.	.	.	45.0	" 96.0	67.37
" III	.	.	.	44.5	" 86.25	67.40

Live Weight Increase per Pig in 133 Days.

				lb.	lb.	lb.
				lb.	lb.	lb.
Lot I	.	.	.	109.25	to 200.5	158.55
" II	.	.	.	139.0	" 184.75	163.22
" III	.	.	.	126.75	" 202.25	166.30

Average Food per 1 lb. Live Weight Increase.

Lot I, 4.26 lb. Lot II, 4.14 lb. Lot III, 4.06 lb.

It will be noted that although the three Lots had the same average live-weight at the start and were treated alike, the average gains in live-weight after 133 days' feeding showed an extreme difference of 7.75 lb., or nearly 5 per cent. of the average live-weight increase.

Second Normal Variation Test.

(November 5, 1930 to March 23, 1931.)

For this test, which lasted 138 days, fifty home-bred pigs, averaging about 13 weeks old, were available. All were from Large White sows by the same boar. They were run as five Lots of ten pigs each, housed in ten sties. The rations used throughout consisted of sharps, barley meal, maize meal, tapioca flour, extracted soya meal and minerals. As in the first test all details of treatment and the amount of food consumed were

8 *Harper Adams College Pig-feeding Experimental Station.*

the same for each Lot. One pig in Lot II and another in Lot III were marked as obviously ailing and their records have been deleted, so that the data for these two Lots refer to nine pigs only in each case.

Initial Weights.

				Range of Variation.	Average.
				lb. lb.	lb.
Lot I	.	.	.	34.5 to 52.75	43.80
„ II	.	.	.	36.75 „ 58.75	44.00
„ III	.	.	.	38.5 „ 53.75	45.20
„ IV	.	.	.	32.5 „ 61.0	43.67
„ V	.	.	.	33.5 „ 60.5	43.72

Live Weight Increase per Pig in 138 Days.

				Range of Variation.	Average.
				lb. lb.	lb.
Lot I	.	.	.	104.25 to 224	158.97
„ II	.	.	.	124.75 „ 193	159.00
„ III	.	.	.	102.25 „ 218.25	156.90
„ IV	.	.	.	95.75 „ 212.75	160.18
„ V	.	.	.	102.25 „ 249.25	165.83

Average Food consumed per 1 lb. Live Weight Increase.

Lot I, 4.35 lb. Lot III, 4.41 lb. Lot V, 4.17 lb.
 „ II, 4.35 „ „ IV, 4.32 „

It will be noted that the pigs in this test were rather younger and lighter at the start than those used for the first test. The rate of gain as compared with food consumption was less satisfactory, but this finds a partial explanation in the fact that the test covered the winter months as compared with the warmer autumn period of the first test. What was surprising, and disappointing in view of the fact that the pigs were all by the same boar, was to find a rather greater degree of variability in the results than in the first test. It will be noted that the average gains in live weight of the Lots for the 138 days showed an extreme difference of 8.9 lb., or $5\frac{1}{2}$ per cent. of the average live-weight increase. It is of interest to note also that with initial weights ranging from 32.5 lb. to 61 lb. the live-weight gains ranged from $95\frac{1}{2}$ lb. to 249 $\frac{1}{2}$ lb.

The widest divergence between the average live-weight increases per Lot shown in our two tests is about $5\frac{1}{2}$ per cent. of the live-weight increase, which implies that we should take about 10 per cent. as a rough allowance for normal variation in assessing the results of our experiments. In other words, unless the average gains of two Lots of ten pigs fed differently show a difference of more than 10 per cent. we shall not be justified in claiming advantage for either ration. The full statistical analysis of the data from the two tests, which has been made by our colleague Mr. F. J. Dudley, M.A., Statistician to the National Poultry Institute, suggests indeed that an even greater allowance should

be made. This and many other points of interest which arise out of these tests will be the subject of a separate publication.

PROTEIN SUPPLY EXPERIMENTS.

The object of these experiments was to determine, *firstly*, whether the cheaper protein-rich vegetable foods, such as soya meal, could effectively replace the expensive animal foods, such as fish meal, and, *secondly*, to determine the optimum proportions in which these supplements should be blended with the cereals.

Comparison of Vegetable Proteins with Fish Meal.

Experiment I. (June 21 to October 11, 1926) (16 Weeks).

This experiment was designed to compare the efficiency, as supplements to a basal cereal ration, of fish meal, bean meal, extracted soya meal and decorticated groundnut meal. A similar experiment was carried out at the same time at Cambridge, and a full report on the two experiments has already been published,¹ so that a brief summary will suffice here, with the comment that the results at each centre were in close agreement.

The amounts of the above foods included in the rations were adjusted to give the same amount of protein as was supplied by 10 per cent. of fish meal. In the case of the three vegetable foods a mineral supplement was also given, but this was deemed unnecessary in the case of the fish meal. In the Harper Adams experiment an extra Lot of pigs was included to test the effect of a simple addition of minerals to the basal cereal ration.

The scheme of feeding was as follows:—

Lot	I.	90 parts cereals + 10 parts White Fish Meal.
„	II.	90 „ „ + 25 parts Bean Meal + 3.5 parts Minerals A.
„	III.	90 „ „ + 13.3 parts Extracted Soya Meal + 3.25 parts Minerals A.
„	IV.	90 „ „ + 11.4 parts Decorticated Groundnut Meal + 3.15 parts Minerals B.
„	V.	90 „ „ + 6.65 parts Extracted Soya Meal + 5.7 parts Decorticated Groundnut Meal + 3.25 parts Minerals C.
„	VI.	90 „ „ + 5 parts Minerals C.

The mineral mixtures used, marked A, B, C above, were prescribed by the Rowett Research Institute as being required to make the mineral supply comparable with that of the fish-meal rations as fed to Lot I. Their nature is indicated below:—

	A. Parts.	B. Parts.	C. Parts.
Ground Limestone . . .	1.5	1.3	1.3
Steamed Bone Flour . . .	1.25	1.5	1.5
Common Salt	0.25	0.1	0.2
Ferric Oxide	0.25	0.25	0.25
Potassium Iodide	0.0004	0.0004	0.0004

¹ Davidson, *Journal of the Ministry of Agriculture*, XXXV (1928-29), 409.

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The 90 parts cereals consisted at first of equal parts of sharps and barley meal, the proportions being altered at intervals until a final mixture of 15 parts sharps and 75 parts barley was reached.

Each Lot comprised ten pigs at the start, but one pig each had to be withdrawn from Lots III and IV, and their records deleted.

The average results are summarised below :—

	Average Initial Weight per Pig. lb.	Average Live Weight Gain per Pig. lb.	Average Food consumed per 1 lb. Live Weight Gain. lb.
Lot I . . .	79.8	141.4	4.08
„ II . . .	78.8	143.7	4.11
„ III . . .	82.0	147.0	4.01
„ IV . . .	80.0	138.0	4.19
„ V . . .	82.2	138.8	4.16
„ VI . . .	79.8	112.5	5.12

It will be seen that the results with Lots I to V all fall within the limit of 10 per cent. that we must allow for normal variation, whether we consider either the live-weight gains or the efficiency of utilisation of the food. In other words, provided mineral deficiencies are made good, the proteins of fish meal, bean meal, soya meal and groundnut meal appear to be of equal value as supplements to the proteins of the cereal meals.

Lot V was included to test the possibility, suggested by an experiment made elsewhere, that soya and groundnut meals together might give better results than either separately, but the results given by this Lot show no evidence of any such superiority.

The results given by Lot VI demonstrate in striking fashion the protein deficiency of a purely cereal diet. It will be seen that the average growth-rate of these pigs was only about four-fifths of that of the Lots receiving the protein supplement along with the cereals, and that the efficiency of utilisation of the food was correspondingly low, more than 5 lb. of meal being required on the average by this Lot to produce a pound of live-weight increase.

The evidence of Experiment I as to the equivalence in value of the vegetable proteins of bean meal, soya meal and groundnut meal with the animal proteins of fish meal has received abundant confirmation in further experiments, both at the Harper Adams Station and elsewhere, as well as in commercial pig-feeding practice. We need only quote here our own Experiment V, which is dealt with in detail later (p. 14) under the studies of protein requirements. So far as the comparison of fish meal with soya meal in this experiment is concerned the results may be summarised as follows :—

Protein Supplement.	No. of Pigs.	Average Live Weight Gain per Pig. lb.	Average Food consumed per 1 lb. Live Weight Gain. lb.
Fish Meal	30	183.2	3.70
Extracted Soya Meal	30	178.5	3.76

Here again the differences are well within the range of normal variation.

One further experiment may be quoted to clinch the case for the vegetable proteins. If we admit that the soya meal can be made to give as good results as fish meal, there still remains the possibility that it may not be equal to a judicious blend of protein rich foods. It was to test this point that the following experiment was planned.

Experiment II. (July 23 to November 17, 1931) (117 Days).

In this experiment extracted soya meal (plus lime and salt) was compared with a mixture in equal parts of dried skim milk, dried yeast, fish meal, meat meal and pea meal. The other foods in the rations were the same in kind and amount in each case. The proportion of soya meal and of protein mixture in the rations started at 9 per cent. and finished at 5 per cent. Each Lot consisted of ten pigs, averaging about 16 weeks in age and 68 lb. in live-weight at the start. The experiment was continued for 117 days, with results as summarised below :—

	Lot I. (Soya). lb.	Lot II. (Mixed Protein Foods). lb.
Average Initial Weight per pig . .	67.75	68.55
„ Live Weight Gain per pig	160.26	151.86
„ Meal consumed per 1 lb.		
Live Weight Increase	3.71	3.91

It will be noted that the differences in live-weight increase and in efficiency of food utilisation fell well within the limits of normal variation, so that this experiment is entirely in accord with the rest in demonstrating that soya meal, supplemented by lime and salt, is fully as efficient as the other protein concentrates commonly used in pig feeding where milk in some form is not available.

Apart from the experimental evidence summarised above a large amount of other support for this conclusion has been obtained at the Station and elsewhere. In our own case, except for a few special experimental Lots, extracted soya meal, in view of its relative cheapness and efficiency, has been the only protein concentrate used for all classes of pigs, both for breeding and feeding purposes, throughout the past three years.

COMPARISON OF DIFFERENT PROPORTIONS OF PROTEIN SUPPLEMENT.

Having established that the basal ration of cereals and minerals requires to be supplemented with food rich in protein, and that the various supplementary proteins in common use are practically equal in value, our attention was turned next to the question as to what proportion of protein supplement is necessary to give the best results, having regard both to rate of growth and economy of feeding. We have now completed a number of experiments on this point, the main features and results of which are summarised below :—

Experiment III. (March 8 to July 26, 1927) (140 Days).

For this experiment, which was regarded as a preliminary exploration of the subject, forty pigs were available, but as they showed rather a wide range in size, instead of dividing them into four Lots of ten pigs each, the twenty largest were taken out and divided into four Lots of five pigs each, and the remaining twenty similarly divided into four Lots. Each set of four Lots was then treated as a separate unit, so that the experiment was really a duplicate test with Lots of five pigs each, there being with each ration one Lot of larger pigs (Lots 1A, 2A, 3A, 4A) and one of smaller pigs (Lots 1B, 2B, 3B, 4B).

The protein concentrate used was a mixture in equal parts of extracted soya meal and decorticated groundnut meal, and the proportions of this were kept constant throughout the test. The scheme of experiment is indicated below :—

	Lots 1A, 1B. Per cent.	Lots 2A, 2B. Per cent.	Lots 3A, 3B. Per cent.	Lots 4A, 4B. Per cent.
Protein Supplement .	4	8	11	14
Cereal Meals . . .	96	92	89	86
Minerals	2	2	2	2

The differences in the proportions of cereals in the various rations were entirely in the sharps item, the proportion of barley meal being kept the same for all. The percentages of protein in the four rations were roughly $13\frac{1}{2}$, $14\frac{1}{2}$, $15\frac{1}{2}$, $16\frac{1}{2}$ respectively.

The average live weight of the larger pigs at the start was about 89 lb., and that of the smaller pigs about 45 lb. After twelve weeks' feeding the larger pigs were sold, but the experimental feeding of the smaller Lots was continued for eight weeks longer. The differences between the amounts of food consumed by the individual Lots in each series were small, so that it will suffice to give the average gains in live weight.

Average Gains in Live Weight per pig for 84 days.

Lot 1A. lb. 92.4	Lot 2A. lb. 96.4	Lot 3A. lb. 102	Lot 4A. lb. 100.1
Lot 1B. lb. 63.2	Lot 2B. lb. 66.2	Lot 3B. lb. 78.4	Lot 4B. lb. 79.9

If we allow a 10 per cent. margin for normal variation it will be seen that in both series Lot I (4 per cent. protein supplement) was definitely behind Lot 3 (11 per cent. protein supplement), whilst Lot 2 (8 per cent. protein supplement), though definitely inferior amongst the smaller pigs, was not so clearly behind with the larger pigs. This is in accordance with expectation since it is well known that in proportion to its size the small pig requires more protein than the larger pig.

It is interesting to note further that in neither series was there any appreciable difference in results between Lots 3 and 4, so that on these results there would not appear to be any advantage in increasing the proportion of protein supplement above 11 per cent., but a definite disadvantage in keeping it as low as 4 per cent.

Over the whole period of 20 weeks for which the smaller pigs were fed the average live weight gains were as follows :—

Lot 1B. lb. 131.2	Lot 2B. lb. 141.6	Lot 3B. lb. 154.5	Lot 4B. lb. 142.5
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During the later period of the experiment one pig each had to be removed from Lots 2B and 4B, which made the averages for these two Lots less reliable, but it will be seen that the conclusions outlined above were clearly confirmed over the longer period.

Experiment IV. (August 9 to October 31, 1927) (84 Days).

In this experiment a more accurate comparison was made of the higher proportions of protein concentrate than was possible in the previous experiment, the pigs available being more uniform in live weight and breeding.

Four Lots of ten pigs each were employed and the protein concentrate used was extracted soya meal, the proportions being as shown below :—

Lot I. Per cent. 9	Lot II. Per cent. 12	Lot III. Per cent. 15	Lot IV. <i>ad lib.</i>
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For Lots I, II and III the soya meal was mixed with the basal ration of sharps, barley meal and minerals and fed as slop, whilst for Lot IV it was given dry in a self-feeder, the basal ration being fed separately in slop form. It is interesting to note that in the early stages of the test this Lot took large amounts of the soya meal, and over the whole period of the experiment the amount of

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soya meal eaten by it averaged 18·8 per cent. of the total food consumption. The experiment lasted 12 weeks and gave the average results set out below :—

	Lot I. lb.	Lot II. lb.	Lot III. lb.	Lot IV. lb.
Initial Live Weight per pig	69·1	68·6	68·5	71·4
Gain in Live Weight per pig	125·6	119·7	117·3	125·5
Total Food per pig	451·0	445·5	429·0	490·3
Weight of Food per 1 lb. Live Weight	3·58	3·72	3·66	3·91

It will be noted that there were no significant differences between the average live weight gains for the four Lots, but that owing to its higher food consumption Lot IV compared unfavourably in efficiency of utilisation of food with the rest, which were practically equal in this respect. This relatively unfavourable outcome of giving the soya meal *ad lib.* was even more pronounced in terms of cost, this meal being the most expensive item in the ration.

This experiment thus confirmed the general indications from Experiment III that the optimum proportion of soya meal lies somewhere between 8 and 12 per cent., and probably nearer the former than the latter figure.

At this stage the results were communicated to a joint committee of representatives of the various institutions concerned with research on pig nutrition, and a scheme was drawn up for a further experiment in which varying proportions both of soya meal and of fish meal should be tested. At the Harper Adams Station the following experiment was subsequently carried out under this scheme.

Experiment V. (May 30 to October 4, 1929) (127 Days).

Six Lots of ten pigs each were used for this experiment, three Lots being on fish meal rations and the other three on soya meal rations containing proportions of extracted soya meal that were rather higher than the corresponding allowances of fish meal in order to make the supplies of digestible protein roughly comparable in the two series. No minerals were added to the fish meal rations, but in the case of the soya meal rations appropriate minerals were added in amounts calculated to make the two sets of rations roughly comparable in mineral content. The feeding scheme is outlined below :—

	Fish Meal Series.			Soya Meal Series.		
	Lot I. Per cent.	Lot II. Per cent.	Lot III. Per cent.	Lot IV. Per cent.	Lot V. Per cent.	Lot VI. Per cent.
Barley	47·25	45	43·25	46	42·5	40
Sharps	47·25	45	43·25	46	42·5	40
Fish Meal	5·5	10	13·5	—	—	—
Soya Meal	—	—	—	6·5	12·5	16
Minerals	—	—	—	1·5	2·5	4

It will be seen that three levels of protein supply were compared both with fish meal and with soya meal. In the soya series Lot IV compares with Lot I of the fish meal series, Lot V with Lot II, and Lot VI with Lot III.

The pigs were crossbreeds of predominantly Large White type, and averaged about 14 weeks old at the start. The feeding period extended over 127 days, with results that are summarised below. The total food consumption was the same for each Lot.

Fish Meal Series.

	Lot I. lb.	Lot II. lb.	Lot III. lb.
Average Initial Weight per pig .	58.6	60.2	59.6
„ Live Weight Gain per pig	179.9	184.9	180
„ Food per 1 lb. Live			
Weight Gain . . .	3.75	3.63	3.73

Soya Meal Series.

	Lot IV. lb.	Lot V. lb.	Lot VI. lb.
Average Initial Weight per pig .	58.0	57.6	56.6
„ Live Weight Gain per pig	178.1	184.6	168.9
„ Food per 1 lb. Live			
Weight Gain . . .	3.77	3.64	3.86

Although the comparison of soya meal with fish meal was only a secondary issue in this experiment it is very definitely of interest and has already been briefly summarised (p. 10). It will be seen that no significant difference was shown between Lots I and IV, or between Lots II and V. The greater, and almost significant, difference between Lots III and VI merely indicates that at these high levels of supply the soya meal is less suited to the pig than the fish meal. In neither case did the results warrant the higher protein allowances, so that the difference, even if really due to the food, is of no practical interest.

The results are entirely confirmatory of our earlier experiments in demonstrating that there is no advantage to be gained in pushing the average proportion of protein concentrate in the ration, whether it be fish meal or soya meal, beyond roughly the 10 per cent. level.

The evidence is not so conclusive as to the superiority of Lot II over Lot I, or of Lot V over Lot IV, but as it was shown consistently every month there is some warrant for concluding that the small differences shown were really due to shortage of protein in the case of Lots I and IV, or in other words that an average supply of 5 per cent. fish meal or 6½ per cent. soya meal in pig-feeding rations is too low for optimum growth.

Experiment VI. (April 30 to September 15, 1931) (138 Days).

In the foregoing experiments the proportion of the special protein concentrate (soya or fish meal) in the ration was kept

roughly constant from start to finish. There is reason to expect, however, that the requirement of the pig for protein will be relatively higher in the earlier than in the later stages of growth. In the further experiments on protein requirements, therefore, this principle was adopted, the proportion of protein concentrate included in the ration being highest at the start and gradually reduced as the experiment progressed.

In Experiment VI two feeding systems were compared, one starting with 15 per cent. soya meal in the ration and finishing with 7 per cent., whilst the other started with 12 per cent. and finished with 5 per cent. The average proportions of soya meal in the rations over the whole period of the experiment were $9\frac{1}{4}$ per cent. and $7\frac{1}{4}$ per cent. respectively. The nature of the feeding is indicated in the following summary:—

	High Protein Lots.		Low Protein Lots.	
	Start. Per cent.	Finish. Per cent.	Start. Per cent.	Finish. Per cent.
Barley Meal . . .	30	35	32	36
Tapioca Flour . . .	—	15	—	15
Maize Meal . . .	20	23	21	24
Sharps . . .	35	20	35	20
Extracted Soya Meal	15	7	12	5
Minerals . . .	$2\frac{1}{4}$	2	$2\frac{1}{4}$	2

For this experiment thirty-six Large White pigs averaging nine weeks old were available. These were divided into two closely comparable groups of eighteen pigs, one group being placed on the higher protein rations and the other on the lower protein ration. Each group was subdivided into three Lots of six pigs each which were housed separately and treated as distinct experimental Lots. In making this subdivision the six largest pigs of each group were drawn as one Lot, and the six smallest as another, so that the three Lots within each group were not strictly comparable with each other. The experiment thus consisted of a comparison of three pairs of Lots of six pigs each on the two systems of feeding. In the course of the test it was found necessary to remove one pig each from Lots A and C, so that the results given below refer to sixteen pigs on the high protein feed and eighteen pigs on the low protein diet.

Average per Pig for 138 Days.

	High Protein Group.			Low Protein Group.		
	Lot A. lb.	Lot B. lb.	Lot C. lb.	Lot D. lb.	Lot E. lb.	Lot F. lb.
Initial Weight . .	41.05	35.9	31.35	41.5	36.2	30.7
Live Weight Gain	178.55	189.9	171.35	174.6	184.1	154.3
Meal consumed . .	503	572	495	548	547	441
Food per 1 lb. Live Weight Gain . . .	2.82	3.01	2.89	3.14	2.97	2.86

Summary.					High Protein. lb.	Low Protein. lb.
Initial Weight	.	.	.	.	36.10	36.14
Live Weight Gain	.	.	.	.	179.93	171.00
Meal consumed	.	.	.	.	523.78	512.53
Food per 1 lb. Live Weight Gain	.	.	.	.	2.91	2.99

It will be noted that the pigs in this test did remarkably well, the ratio of meal consumed to live weight increase produced being unusually low for so long a feeding period. If the figures for weight of food consumed per 1 lb. live weight gain be compared it will be seen that, with perhaps one exception there is no significant difference in favour of the higher allowance of soya meal (cf. Lots A and D; B and E; C and F). The one difference that is perhaps large enough to be significant is the comparison of Lots A and D—the largest pigs. In view of this exception it is of interest to compare the progress of the Lots month by month as set out below. Having regard to the differences in the amounts of food consumed by the various Lots the comparison is based upon the average amounts of food consumed per 1 lb. live weight increase.

Average Weights of Food Consumed per 1 lb. Live Weight Gain for successive 4-Week Periods.

	Lot A. lb.	Lot D. lb.	Lot B. lb.	Lot E. lb.	Lot C. lb.	Lot F. lb.	Average. A, B, C, D, E, F. lb.	
1st month	2.21	2.24	2.07	2.03	2.06	2.03	2.12	2.11
2nd "	2.30	2.42	2.52	2.44	2.44	2.50	2.42	2.45
3rd "	2.73	3.12	2.70	2.99	2.56	2.84	2.67	2.99
4th "	2.49	3.19	2.97	2.91	2.75	2.65	2.74	2.92
5th "	4.35	4.53	4.52	4.06	4.59	4.01	4.48	4.20

From these monthly records we see that for the first 8 weeks there was no significant difference in the efficiency of utilisation of the rations in any of the Lots, but that in the third month all the "low protein" Lots fell behind as was the case also in the fourth month with the heaviest pigs (Lots A and D), although the medium-sized Lots (B and E) and the lightest pigs (C and F) did not show any significant difference in this latter period. The great falling off in efficiency all round in the fifth month is curious and did not admit of any obvious explanation at the time. It will be noted that it was on the whole more marked in the "high protein" than in the "low protein" Lots. If we compare the average food utilisation figures for the combined groups as given in the extreme columns to the right of the table, we see that they confirm the general conclusion that whereas in the first eight weeks the "high protein" ration gave no better results than the "low protein" ration, it proved slightly superior in the later stages of feeding, apart possibly from the closing month. The data suggest that perhaps in the case of the low protein ration

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we reduced the proportion of soya meal in the ration too quickly, the average proportions included each month being as set out below :—

Percentage of Soya Meal in Rations.

	1st Month. Per cent.	2nd. Per cent.	3rd. Per cent.	4th. Per cent.	5th. Per cent.	Average for Whole Period. Per cent.
High Soya Ration	14.1	13.0	10.0	8.0	6.8	9.34
Low ,, ,,	11.7	10.1	7.9	5.9	4.9	7.30

It will be noted that the proportion of soya meal was dropped rather sharply in the third month, and there can be little doubt that this created a slight deficiency of protein at this stage in the case of the "low protein" Lots. In a further experiment on similar lines that is in progress at the time of writing an effort is being made to avoid this mistake, and at the present time, after 17 weeks' feeding there is no difference between the rate of progress of the "high protein" and "low protein" Lots. It would thus appear from these later experiments that a ration including soya meal to the extent of about 12 per cent. for the newly-weaned pig and reduced gradually to about 5 per cent. at bacon weights is the most economic to use. This will give an average of about 8 per cent. of soya meal for the whole feeding period, which is closely in accord with the indications of our earlier experiments. No greater rate of growth can be secured by pushing the proportions of the soya meal beyond these levels, and from Experiment V it would appear that the same probably applies to the use of fish meal.

MINERAL SUPPLY EXPERIMENTS.

Having demonstrated that extracted soya meal is an effective protein supplement for use with the cereal meals in pig rations we were next interested to learn precisely what mineral supplements must be added to the mixture of cereal and soya meals in order to make it fully effective. In the absence of definite guidance on this point we thought it desirable in our earlier experiments with soya meal to use rather complicated mineral mixtures, such as are indicated under Experiment I (p. 9), which were designed to safeguard the supply of a wide range of mineral ingredients, such as lime, phosphorus, potash, iron, salt and iodine. Evidence was soon forthcoming, however, which showed clearly that under the system of management followed at the Station a simple mixture of limestone, bone flour and salt would give just as good results as the more complex and expensive mixtures. Subsequent experience and experimental work elsewhere have abundantly confirmed this observation. It seemed probable, moreover, that the mineral supplement might be simplified and cheapened still further by the elimination of the

bone flour. The purpose of this ingredient is to safeguard the supplies of the extremely important mineral element, phosphorus, whilst at the same time it assists in assuring the supply of lime. The cereals and their by-product meals are, however, reasonably well supplied with phosphorus—bran, indeed, being probably richer in this element than any other vegetable food in common use. As the use of bone flour can only be justified if there is a real deficiency of phosphorus in our rations it was obviously desirable that the question should be put to the test of experiment. On rather different grounds it was also desirable to ascertain whether the inclusion of salt in the mineral supplement was essential. The cereals are certainly very poor in both the component elements of salt (sodium and chlorine), but on the other hand the pig can only tolerate very small amounts of salt. The following two experiments were designed, therefore, to test these two points, firstly whether bone flour was necessary, and secondly whether salt was required.

Experiment VII. (October 24, 1929, to February 25, 1930)
(124 Days).

For the purpose of this experiment three Lots, each of nine Large White pigs, were used. The average age of the pigs at the start was about 15 weeks, and average live weight about 55 lb. The only differences in feeding the Lots lay in the nature of the mineral supplements added to the basal meal rations of sharps, barley, tapioca and soya meals. The weight of minerals used was 2 per cent. of the meal ration in all cases, and the differences in composition were as shown below :—

	Lot A. Parts.	Lot B. Parts.	Lot C.
Ground Limestone	6	11	Limestone
Steamed Bone Flour	5	—	only
Salt	1	1	

From the outset, Lot C began to fall behind the other Lots, losing appetite and steadily developing a decidedly unthrifty appearance. This is very apparent in the appended summary of the position at the end of the first ten weeks :—

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Initial Weight per Pig	56.75	56.4	52.1
Average Live Weight Gain per Pig	90.2	93.4	65.3
Average Food consumed per 1 lb. Live Weight Gain	3.31	3.20	4.57

As there seemed to be no useful purpose in continuing to withhold the allowance of salt from Lot C, it was given the same allowance as Lot B from the eleventh week to the end of the

test. The improvement in Lot C was immediate, and for this second period of 54 days the average results were as follows :

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Average Live Weight Gain per Pig	79.0	81.7	91.4
Average Food consumed per 1 lb. Live Weight Gain .	4.39	4.32	3.86

It will be noted that after getting the very small allowance of salt Lot C actually made up part of the leeway lost in the first 10 weeks, and showed the best average gain of the three Lots in the 54 days. Lots A and B continued to run closely parallel, no advantage therefore being shown for the feeding of bone flour to Lot A.

The average results for the whole feeding period of 124 days are summarised below :—

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Average Live Weight Gain per Pig	169.2	175.1	156.7
Average Food consumed per 1 lb. Live Weight Gain .	3.85	3.72	4.20

Further comment may be reserved until we have given the results of Experiment VIII, which was a precise duplicate of Experiment VII, started at the same time, but with younger and smaller pigs.

Experiment VIII. (October 24, 1929, to April 15, 1930) (173 Days).

In this experiment each Lot comprised ten pigs of Large White × Wessex breeding. They were about 8 weeks old at the start, with an average weight of about 24 lb. The scheme of feeding was precisely the same as in Experiment VII, except that rather more sharps and less tapioca meal was fed. The only feeding differences between the Lots were in the mineral supplements, which were as given above under Experiment VII.

Lot C again was marked out from the start by its slow progress and general unthriftiness. The results for the first 10 weeks are summarised below :—

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Initial Weight per Pig	23.6	24.25	24.0
Average Live Weight Gain per Pig	53.0	52.3	37.3
Average Food consumed per 1 lb. Live Weight Gain .	3.15	3.19	4.47

As in Experiment VII, it was not thought desirable or necessary to continue Lot C without salt, and from the eleventh week onwards this Lot received precisely the same mineral supplement

as Lot B, *viz.*, 2 per cent. of a mixture of 11 parts ground limestone and 1 part of salt. The pigs of Lot C responded immediately to the change, but in order to test whether the very small allowance of salt used was adequate, this was raised in the case of Lots B and C after the eighteenth week to 2 per cent. of a mixture of 11 parts limestone with $2\frac{1}{2}$ parts salt (or 5 : 1). It is of interest, therefore, to compare the records of these two Lots with those of Lot A for the period from the nineteenth week to the end of the test. The essential data are set out below :—

Results from 19th week to end ; 47 Days.

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Initial Live Weight per Pig	142.7	145.05	130.8
Average Live Weight Gain per Pig	77.6	78.2	81.1
Food consumed per 1 lb. Live			
Weight Gain	4.27	4.24	4.09

It will be seen that the extra allowance of salt to Lots B and C did not effect any significant improvement in the results.

The average results for the whole period of the test, 173 days, are set out below :—

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Average Initial Weight per Pig	23.6	24.25	24.0
Live Weight Gain per			
Pig	196.7	199.0	187.9
Average Food consumed per			
Pig	755.6	755.6	755.6
Average Food consumed per			
1 lb. Live Weight Gain	3.83	3.79	4.02

On the question as to the need or otherwise for the inclusion of bone flour in the mineral supplement the two experiments are in close agreement and decisive ; in neither is Lot B (no bone flour) inferior to Lot A. Equally concordant and decisive is their evidence as to the need of a small proportion of salt in the mineral supplement, although apparently as little as 0.2 per cent. is adequate.

Similar and more extensive experiments carried out by Sheehy,¹ in Ireland have led to precisely the same conclusions as to the adequacy of the simple mineral mixture of limestone and salt.

On the questions as to the optimum ratio of limestone to salt in the supplement and the optimum proportion of this mixture to add to the cereal-soya rations further experimental work is required.

VALUE OF TAPIOCA FLOUR.

The basis of all pig-feeding rations must be a foodstuff or food-stuffs rich in starch. For this purpose recourse is commonly had

¹ Sheehy, *Journal Irish Dept. Agric.*, XXX, 1.

to barley or maize or a mixture of the two cereals, with wheat as an occasional and partial alternative. There is no obvious reason, however, why any wholesome food rich in starch and low in fibre should not give equally good results, and any supplies of such materials at prices that compare favourably with those of barley and maize will always, therefore, be worthy of attention. Such a material has been available in large quantities during the past few years in the form of tapioca (or manioc) root flour. Prior to 1931 it was distinctly cheaper than either maize or barley, but little was known as to its actual feeding characteristics and nutritive value.

Various qualities of the material are available differing mainly in fibre content, but as fibre is of little value to the pig, it is advisable to use only high-grade tapioca flour in pig feeding. Material of this class is a fine, almost white floury material, dusty to handle, but soaking readily in water and swelling up appreciably in the process. It commonly contains as much as 80 per cent. of starchy carbohydrates, with only about 3 per cent. proteins, 2 per cent. fibre, 2 per cent. minerals and less than 1 per cent. of oil. The low oil-content may be ranked an advantage for pig-feeding purposes, since it makes for good quality in the bacon. In one respect only is tapioca flour inferior in composition to the cereals, namely in its poverty in protein, and a little allowance must therefore be made for this when replacing barley, maize or wheat, by tapioca flour. Our attention was first directed to tapioca flour at the Harper Adams Station in the winter of 1927-28, when tapioca flour was obtainable at two-thirds the price of maize meal. Two experiments have since been carried out, the nature and results of which are briefly described below.

Experiment IX. (March 13 to September 10, 1928) (182 Days).

A report on this experiment has been published elsewhere,¹ so that it will suffice to summarise the salient features here. The test consisted of a comparison of high-grade tapioca flour against an equal weight of well-ground maize meal. All other foods were the same in kind and amount for all the pigs. Sixteen pigs of Large White type, partly pure bred and partly first cross, were divided equally into two Lots. The proportions of maize meal (Lot A) and of tapioca flour (Lot B) rose steadily from 10 per cent. of the ration at the outset to 25 per cent. at the finish. The rest of the ration consisted of barley, sharps, extracted soya meal and minerals. The proportions of soya meal used were the same for each Lot, but to ensure adequate protein they were kept fairly high, starting at 16 per cent. and finishing at 10 per cent. for each Lot.

¹ Fullerton, *Journal Min. Agric.*, XXXVI, (1929), 132.

For some reason that could not be diagnosed neither Lot ate very well and the rates of growth were therefore rather low in each case. There were no digestive disturbances, however, and the tapioca rations were found to agree very well with the pigs. At the end of 22 weeks three pigs from the maize Lot and four from the tapioca Lot were sent away, so that it will be convenient to give the comparative results at the end of that period as set out below :—

	Lot A. (Maize). lb.	Lot B. (Tapioca). lb.
Average Initial Live Weight per Pig .	59.4	59.25
„ Live Weight Gain per Pig .	152.3	167.2
„ Weight Food consumed per Pig	609.9	673.0
„ Weight Food per lb. Live Weight Gain	4.00	4.02

It will be seen that the rather higher gain registered by Lot B is accounted for by a slightly higher consumption of food, the actual efficiency of utilisation of the food being the same in each case.

The remaining nine pigs were fed for a further four weeks, and the final results when all had been disposed of are summarised below :—

	Lot A. lb.	Lot B. lb.
Total Gain in Live Weight	1,404	1,510
„ Food consumed	5,789	6,196
Average Food per 1 lb. Live Weight Gain	4.12	4.10

The average carcass percentages were 80.5 for Lot A and 81.4 for Lot B, these percentages being based upon the live weights taken at the factory immediately before killing, after a full day's fast. The bacon from the tapioca-fed pigs was judged to be of better quality than that from the maize-fed pigs and this was confirmed by cooking tests.

Experiment X. (March 26 to July 11, 1929) (106 Days).

This experiment was planned as a comparison of high-grade and low-grade tapioca meals against maize meal. Unfortunately the consignment of low grade tapioca meal procured for the purpose proved to be abnormal and therefore the results obtained with it have no special interest and may be dismissed with the general comment that this material proved to be very inferior to the high-grade article and not worth consideration as a high-grade pig feed.

With the other two Lots of ten pigs each the comparison of the maize and high grade tapioca flour was made on the same lines as in Experiment IX. The proportions of maize and tapioca respectively in the rations for the two Lots rose from about 21 per cent. at the start to about 58 per cent. at the finish,

24 *Harper Adams College Pig-feeding Experimental Station.*

with an average of 43.3 per cent. for the whole period. The experimental meals were thus fed more heavily than in Experiment IX, but even up to the high proportions indicated the tapioca proved a perfectly wholesome feed, suited to the pigs. The results for the feeding period of 106 days are summarised below :—

	Lot A. (Maize). lb.	Lot B. (Tapioca). lb.
Average Initial Live Weight per Pig .	79.6	80.2
„ Live Weight Gain per Pig .	156.2	152.2
„ Food consumed per Pig .	573.5	573.5
„ Food consumed per 1 lb. Live Weight Gain	3.67	3.77

Here again, as in Experiment IX, no measurable difference is shown between the maize and tapioca. The bacon of the tapioca-fed pigs was again the better of the two Lots. These conclusions have subsequently been abundantly confirmed in the general feeding practice of the piggery in which many tons of tapioca flour have now been used with unfailing success, and we have no hesitation in recommending it for general use as an alternative to the cereals when prices make its use attractive, or when high carcass quality is being specially aimed at.

VALUE OF DRIED SUGAR BEET PULP AS SUBSTITUTE FOR SHARPS.

The widespread use of wheat sharps in pig-feeding cannot be justified on grounds of nutritive value alone, since judged by this standard this food is usually expensive when compared with the more concentrated starchy meals such as barley, maize and tapioca. It is a matter of common experience, however, that sharps suit the digestive organs of the pig and that, especially with young pigs, there is less risk of digestive trouble in the use of the more concentrated and "heating" foods if they are diluted with a proportion of sharps. The property of sharps which confers this advantage is probably its "lightness" which imparts a suitable degree of bulkiness to the rations, whilst at the same time its moderately fibrous character further promotes a normal rate of passage of the food by mechanical stimulus of the digestive organs. Viewed from this standpoint it would appear that other foods which contain a suitable quality and proportion of fibre, and swell up in water sufficiently to lighten the ration might be made to serve as substitutes, in part if not entirely, for sharps. Such a substitute, if successful, would serve a further useful purpose in helping to keep the price of sharps at a level more nearly consonant with its real value than is often the case.

If our conception of the function of sharps is sound there would appear to be possibilities in the use of dried sugar beet pulp for pigs, since this food will impart bulk, and contains a

fair proportion of fibre which has been shown by Woodman in digestion trials at Cambridge to be well digested by the pig. In order to test the point and to obtain more precise guidance on the possibilities of beet pulp for pig feeding a preliminary trial was made at the Harper Adams Station early in 1929, and on the basis of the experience then gained a definite test against sharps was carried out. In all cases the "plain" variety of dried pulp has been used in order to reduce the risks of "scouring" which were anticipated to be likely with the "molassed" pulp.

In the preliminary tests it was found that the great increase in bulk assumed by beet pulp when soaked in water imposed serious restrictions upon the proportion of it that could be included in the rations, especially in the later stages when the pig was required to consume some 6 lb. or 7 lb. total meals per day. At this stage it was found necessary to give the day's allowance in at least three feeds, and even then not more than about 20 per cent. of dried pulp could be included. At earlier stages of the feeding period the pulp could be used rather more freely, but when the amount reached 25 to 30 per cent. of the total ration signs of scouring appeared. For practical purposes, therefore, we consider about 20 per cent. of dried beet pulp to be the most that can be conveniently included in pig rations. Guided by this preliminary experience we then proceeded to the following experiment.

Experiment XI. (August 27 to December 17, 1929) (112 Days).

For this experiment thirty Large White pigs, of average age about 15 weeks, were used, and divided into three equal Lots. Lot A received sharps, Lot B an equal amount of dried beet pulp in place of sharps, whilst Lot C received neither sharps nor beet pulp. Apart from these differences, and an adjustment of the proportions of soya meal to secure roughly equal supplies of protein to the three Lots, they were fed alike, the average rations and total consumption per pig for the whole period being as given below :—

	Lot A. Per cent.	Lot B. Per cent.	Lot C. Per cent.
Barley Meal	44.4	42.3	58.2
Tapioca Flour	20.8	20.2	21.6
Extracted Soya Meal . .	10.7	13.0	18.0
Sharps	21.9	—	—
Dried Beet Pulp	—	22.3	—
Minerals	2.2	2.2	2.2
	lb.	lb.	lb.
Total Food consumed per Pig	610	608	609

The minerals used were a mixture of limestone, steamed bone flour and salt.

The rations are perhaps a little open to criticism on the rather

high proportions of soya meal used, but at the time we did not feel justified in going below 10 per cent. in the ration for Lot A, which necessitated higher proportions for Lots B and C to ensure that the protein content of the three rations was the same.

The inclusion of Lot C was intended to show whether, apart from considerations of cost, there was any real need for the inclusion of sharps in pig rations. It is not uncommon, especially with young pigs, to experience digestive trouble when concentrated foods such as barley and maize are fed without some diluting ingredient like sharps, but no such trouble arose in the course of this experiment.

One pig in Lot A died in the course of the test and its records were discarded, the averages for this Lot being based therefore upon nine pigs. Apart from this incident the course of the test showed no special features, all the Lots eating well and growing at a satisfactory rate. The average results for the whole period of 15 weeks are set out below:—

	Lot A. (Sharps). lb.	Lot B. (Beet Pulp). lb.	Lot C. (No sharps; no beet pulp). lb.
Average Initial Live Weight per Pig	53.0	53.7	54.85
Average Live Weight Gain per Pig	165.85	165.4	170.2
Average Food consumed per 1 lb. Live Weight Gain	3.69	3.68	3.58

Total Foods Consumed, per Pig.

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Barley	271	257	356
Tapioca	128	123	132
Sharps	134	—	—
Beet Pulp	—	137	—
Soya Meal	65	79	109
Minerals	12	12	12

From the upper part of the table of results it is clear that there were no significant differences between the Lots, or in other words, taking into account the amounts of the various foods consumed, as shown in the lower half of the table, 137 lb. of dried beet pulp plus 14 lb. soya meal (Lot B) has proved equal to 134 lb. sharps plus 19 lb. mixed barley and tapioca meals (Lot A). This may be rounded off into a general conclusion that, up to a limit of about 20 per cent., sharps may be replaced, pound for pound, in pig rations by a mixture of dried beet pulp with 10 per cent. of its weight of extracted soya meal.

The data for Lot C have no bearing upon the comparison of sharps and dried pulp, but it is of interest to note that whereas this Lot had a more concentrated and expensive ration than

either A or B it did not show any better rate of growth. There can be little doubt that barley meal, when fully utilised by the animal, has a higher nutritive value than either sharps or dried beet pulp, so that the results with Lot C give some support to the view expressed above that it is desirable to "lighten" pig rations by the inclusion of some material, such as sharps or dried beet pulp, that will impart the necessary degree of bulkiness required apparently to secure the full utilisation of the other ingredients of the ration.

THE WATER REQUIREMENTS OF THE PIG.

The supply of water to the pig in the slop feeding system is rarely more than very roughly controlled. All too often the supply is excessive, whereby an unnecessary burden is placed upon the animal, and the warming up and disposal of the excess of water consumed may involve an actual wastage of food. It is commonly taught that the water requirements will be roughly proportional to the amount of dry substance consumed, and that for the pig an average ratio of about 3 : 1 is probably near the mark. Furthermore, both science and practical experience suggest that in proportion to its size the water requirements of the pig will be greater during the earlier than in the later stages of growth.

In the course of our experiments indications were obtained that a lower average supply of water than the ratio 3 : 1 implies might be adequate for the needs of the pig, and in order to obtain more precise information on the point the following comparison of two different levels of water supply was carried out.

Experiment XII. (February 12 to May 17, 1931) (94 Days).

Twenty pigs, mostly Large White \times Middle White cross and averaging 14 weeks old, were divided into two Lots and fed exactly alike except for the proportions of water supplied. The meal rations were mixtures of barley, maize and tapioca meals with sharps, soya meal, limestone and salt. The proportion of water to meal for Lot A started at $2\frac{1}{2}$: 1 and was gradually reduced to 2 : 1 as the pigs grew. For Lot B the initial proportion was 3 : 1 gradually reduced to about $2\frac{3}{4}$: 1. No other supply of water was provided. The total amounts of water supplied per pig over the whole period were 84 gallons for Lot A and 114 gallons for Lot B, or a difference of roughly 40 per cent. The weights of meal consumed by each Lot were the same throughout, but owing to the greater volume of slop in which the meal was suspended Lot B always required longer to clean up their feed than Lot A. There was no significant difference in the utilisation of the feed, as may be seen from the appended summary of the results :—

	Lot A. lb.	Lot B. lb.
Average Initial Live Weight per Pig	53.05	52.9
„ Live Weight Gain per Pig .	101	105.1
„ Food consumed per 1 lb.		
Live Weight Gain	3.79	3.64

It may perhaps be urged that the rates of growth were only moderate in each case, and that the test was made in the cooler part of the year. Consequently it remains possible that with more rapid growth and in hot weather a rather higher supply of water than that given to Lot A might prove to be desirable. It is clear, however, that under the conditions of the test labour was expended wastefully in carrying to the ten pigs of Lot B 300 gallons of water more than the pigs required. From our experience, supplemented by this experiment, we are inclined to advise that the water : meal ratio should be about 3 : 1 (or 1 gallon of water to about 3½ lb. meal) for the first six to eight weeks following weaning, and thereafter gradually reduced so that about bacon weight the slop becomes a thick paste with about 1½ lb. water per 1 lb. meal (or 1 gallon of water to about 5½ lb. meal).

THE ECONOMIC VALUE OF MILK IN PIG FEEDING.

Reference was made on an earlier page to the part that pig feeding has always played as an adjunct to the manufacture of butter and cheese. The prosperity of Denmark has been largely derived from the close interlocking of these two industries, but in our own country the preponderant demands of the liquid milk trade upon our supplies have prevented any considerable development along these lines. For the great majority of our milk producers the pig can only come into account as a possible agent for the profitable disposal of "surplus" milk in periods of glut of supplies. With the falling tendency of milk prices in recent years, and particularly the very low level of price now realisable by direct sale for milk which falls within the category of "surplus," the merits of alternative methods of disposal have acquired an increased interest and importance, and it has become desirable to re-examine the possibilities of indirect disposal through feeding to livestock.

So far as the pig is concerned in this connection there are various possibilities since the milk may either be fed as such, or as separated milk in conjunction with the sale of cream or butter, or as whey in association with the production of cheese. On many milk-selling farms the making of cheese is quite impracticable, and even the making of butter only a degree less inconvenient, although in most cases the installation of a separator and disposal of cream might not offer serious difficulties. In the majority of cases, therefore, if surplus milk is to be disposed of at home through livestock, it must be fed either direct or as

separated milk. Very diverse statements as to the value realisable through the pig for whole milk and separated milk have appeared from time to time in the agricultural press, and enquiries for guidance in the matter revealed a necessity for a review of the older experimental work on the subject. The initiative in this direction was taken by the Ministry of Agriculture in the spring of 1928 by convening a conference of representatives of educational institutions at which a scheme of conjoint experiment was formulated with a view to trial at various centres. The following experiment (Experiment XIII) was subsequently carried out under this scheme at the Harper Adams Station, but as the data have since been embodied in a joint report published elsewhere¹ a brief summary will suffice here.

Experiment XIII. (July 17, 1928, to January 29, 1929) (28 Weeks).

For this experiment four Lots of ten pigs each were used and fed in accordance with the following scheme:—

Lot A.	Basal Ration of cereals + minerals (3 per cent.).
„ B.	„ „ „ „ + whole milk ($\frac{1}{2}$ gall. per head daily).
„ C.	„ „ „ „ + separated milk ($\frac{1}{2}$ gall. per head daily).
„ D.	„ „ „ „ + minerals + extracted soya meal.

The minerals used for Lots A and D were a mixture of limestone (2), steamed bone flour (2) and salt (1).

Pigs were drafted out from the Lots as and when they reached suitable weights, and by the end of the 28 weeks all the pigs in Lot D had been sold, four from Lot A, nine from Lot B and eight from Lot C. In calculating the results the values of the nine pigs remaining unsold at the close of the experiment have been assessed on the basis of the standard table of live and dead weights of the East Anglian Pig Recording Scheme. As was to be expected the pigs of Lot A lagged behind the rest from the start, but for some reason which could not be diagnosed the two milk Lots (B and C) did not make quite the rate of growth that was expected, as the long duration of the experiment indicates.

In the appended summary of results the costs actually incurred and prices realised for the fat pigs at the time of the experiment have been used, these being as follows:—

Cost of basal cereal ration, per cwt.	s. d.
„ „ soya meal, per cwt.	11 4
Price realized per 20 lb. for fat pigs (average)	10 10
	16 0

Labour has been charged at 2d. per week per pig. All other charges would be the same for each Lot and therefore need not be brought into account as the results are comparative.

¹ Crowther, *Journal Min. Agric.*, XXXVI, 541 (Sept., 1930).

Summary of Data.

	Lot A. (Basal only).	Lot B. (Basal + Whole Milk).	Lot C. (Basal + Sep. Milk).	Lot D. (Basal + Soya).
Average Feeding Period, days	196	168	183.4*	189
Average Initial Live Weight, lb. per Pig	37.4	38.3	37.6	37.6
Average Final Live Weight, lb. per Pig	208.8	248.3	240.7*	252.4
Average Daily Live Weight Gain, lb. per Pig	0.88	1.25	1.11*	1.14
Average Carcass Weight, lb. per Pig	150.9	188.4	191.6*	192.4
Average Weight Basal Ra- tion consumed, lb. per Pig	784.4	634.8	732.4	792.6
Milk consumed, gallons per Pig	—	83.7	91.7*	—
Weight of Soya Meal con- sumed by Lot D, average per Pig	—	—	—	97.6
Cost of Basal Ration per Pig	s. 79 d. 7	s. 63 d. 4	s. 73 d. 6	s. 80 d. 5
Amount realised per Pig	120 9	150 9	153 3	153 11
Cost of Labour per Pig	4 8	4 0	4 4	4 6
Surplus realised over cost of meals and labour	36 6	83 5	75 5*	69 0
Value realised for 83.7 gallons whole milk (Lot B — Lot A) = 83s. 5d. — 36s. 6d. = 46s. 11d. = 6.72 d. per gallon.				
Value realised for 91.7 gallons separated milk (Lot C — Lot A) = 75s. 5d. — 36s. 6d. = 38s. 11d. = 5.09d. per gallon.*				
Value realised for 97.6 lb. soya meal (Lot D — Lot A) = 69s. 0d. — 36s. 6d. = 32s. 6d.* = 37s. 4d. per cwt.*				

* These figures differ slightly from those given in the original Report owing to the correction of small errors subsequently detected.

The results given by Lot D are an impressive demonstration of the protein deficiency of a purely cereal diet (Lot A) to which reference was made earlier (pp. 5 and 10). The addition of a small proportion of soya meal to the cereal ration was clearly a very profitable investment.

In working out the values realised for the whole milk, separated milk and soya meal as given above, we have credited the basal cereal meals consumed by each Lot with the value realisable from them when fed alone, as shown by Lot A. The surplus then remaining represents the value realised for the whole milk, separated milk and soya meal respectively. This surplus is not necessarily all profit, but represents the amounts by which the use of the supplements has improved the returns.

In comparing the results it must be borne in mind that they have reference to conditions as to prices of fat pigs and of feeding stuffs very different from those prevailing now, but this is partially offset by the fact that the rate of growth in the milk-fed Lots was slower than is commonly expected. Under these

conditions the whole milk realised a value of $6\frac{3}{4}d.$ per gallon and the separated milk $5d.$ per gallon. These figures, whilst encouraging so far as the use of separated milk is concerned, are less so for the direct feeding of whole milk. If, for example, the cream from the milk had been converted into butter sold at $1s. 6d.$ per lb., and $5d.$ per gallon realised through the pig for the separated milk, this would mean a total value realised in this way for the whole milk of about $11\frac{1}{2}d.$ per gallon, as contrasted with the $6\frac{3}{4}d.$ realised by direct feeding to the pig. Where cream could be sold as such the difference against the feeding of whole milk would be even greater.

Translated more nearly into terms of values recently current, if the price of the basal cereal ration be taken, say, at $7s.$ per cwt. and of bacon pigs at $10s.$ per score, the values realisable for whole milk and separated milk fed to the pig on the basis of our experimental data would be $4d.$ and $3d.$ per gallon respectively.

It is clear that no fixed economic value can be placed upon milk used in pig-feeding, since this will vary with the cost of store pigs and of meals, with the rate of progress secured, the price obtained for the fat pig, and probably the method of using the milk (cf. Experiments XIV, XV).

The method of calculation used above is open to the criticism that it implies that the pigs fed on the cereal meals alone (Lot A) have at least "made ends meet," which fortunately happened to be the case in the experiment, the surplus of $36s. 6d.$ per pig in Lot A being just about equal to the initial cost of the pig plus charges other than labour that must be debited against the feeding. An alternative method of assessing the return obtained from the milk may be used if we assume that the pigs are kept solely for the purpose of disposing of the milk and that any surplus remaining after the feeder has recovered his outlay on store pigs, labour, meal, and all overhead charges may therefore be credited to the milk. In other words the meal used is treated merely as an instrument for securing the effective disposal of the milk and no profit is claimed for it. If, for example, taking roughly values current to-day, we take the initial value of the 9-week old pig at $20s.$, cereal meals at $7s.$ per cwt., labour and overhead charges at $4d.$ per pig per week, and a price of $10s.$ per score dead weight for baconers, the value realised for separated milk on the data for Lot C would work out as follows:—

<i>Income.</i>		<i>s. d.</i>
191.6 lb. carcass at $6d.$ per lb.		95 10
<i>Expenditure (excluding separated milk).</i>		
Initial cost of Pig	20 0	} 74 3
Cost of Meals fed	45 7	
Labour, etc., for 183 days	8 8	

Surplus, being value realised for 91.7 gal. separated milk 21 7
 $=2.82d.$ per gallon.

The result of 2.82d. is in close agreement with the 3d. per gallon deduced by the first method. The same method applied to the data for Lot B leads to a value of 3.84d. per gallon realised for the whole milk.

On the basis of the data given by Lot C, assuming that 8-week-old weaners can be got for 20s. each, and are given separated milk at the rate of 4 pints per head per day up to bacon weights, the value per gallon realised for the separated milk can be worked out for different prices of food and of fat pigs, the other items of cost of feeding being assumed to remain constant. Each increase of 1s. per score for the fat pig at any one food price raises the value of the milk by 1½d. per gallon, whilst each rise of 1s. per cwt. of food at any one price for fat pigs reduces the value of the milk by 0.85d. per gallon. On this basis the appended table has been constructed for a range from 7s. to 12s. per cwt. in food prices and of 10s. to 15s. per score for baconers.

Estimated Value of Separated Milk per gallon.

Fat Pig, per score	10s.	11s.	12s.	13s.	14s.	15s.
	Pence.	Pence.	Pence.	Pence.	Pence.	Pence.
Cost of Food, per cwt.						
7s.	2.8	4.0	5.3	6.5	7.8	9.0
8s.	2.0	3.2	4.5	5.7	7.0	8.2
9s.	1.1	2.3	3.6	4.8	6.1	7.3
10s.	0.3	1.5	2.8	4.0	5.3	6.5
11s.	—	0.6	1.9	3.1	4.4	5.6
12s.	—	—	1.1	2.3	3.6	4.8

For every 1s. paid for the weaner over 20s. the values need to be reduced by about 0.1d. It should also be noted that these data do not allow for any losses of pigs during the feeding period.

In Experiment XIII the milk was fed at a standard rate of 4 pints per head per day from start to finish, but it is doubtful whether this is the most profitable way of using it. Generally speaking, one would expect that the returns for milk consumed would tend to rise with a reduction in the daily allowance (or in other words by spreading a given amount of milk over more pigs), and furthermore there is some reason to think that milk will be more profitably utilised by young pigs than by older pigs. In order to get some guidance on these two points the further milk-feeding experiments described below were carried out.

Experiment XIV. (April 29 to September 23, 1930) (147 Days).

This experiment, which was carried out with three Lots of nine Large White pigs each, was designed to measure the effects of quite small allowances of separated milk when fed along with a basal meal ration. In order that there should be no shortage of

protein and minerals, soya meal, limestone and salt were included in the basal rations, which were made up as indicated below.

	Start. Per cent.	Finish. Per cent.
Barley Meal	35	30
Tapioca Flour	30	48½
Sharps	25	15
Extracted Soya Meal	10	5
Minerals	2½	1½

These rations were the same for all Lots, but Lot B received in addition *one pint* of separated milk per head per day, whilst Lot C received *two pints* per head per day. These two Lots showed a rather keener appetite throughout than Lot A, and were very soon easily identifiable by their superior "bloom." The growth and food consumption data are summarised below.

	Lot A. (No Milk). lb.	Lot B. (1 pint Sep. Milk). lb.	Lot C. (2 pints Sep. Milk). lb.
Average Initial Weight per Pig	46.6	47.9	49.5
Average Live Weight Gain per Pig	161	182.5	197.1
Average Carcass Weight per Pig	156.8*	179.2†	192.3
Average Meal consumed per Pig	633	697	751
Average Milk consumed per Pig	—	147 pints	294 pints

* Estimated from results with 5 pigs sold, 4 unsold.

† " " " " 8 " " 1 "

Since labour and initial cost of pigs are the same for each Lot it will suffice to compare the monetary returns against cost of food as set out below. Instead of taking the actual values at the time of the experiment we have taken carcass values at 10s. per score (6d. per lb.) and meals at 7s. per cwt.

	Lot A. s. d.	Lot B. s. d.	Lot C. s. d.
Value per Pig realised at 6d. per lb. carcass weight	78 5	89 7	96 2
Cost of meals per Pig at 7s. per cwt.	39 7	43 7	46 11
Margin	38 10	46 0	49 3
Surplus realised by use of milk (i.e. over Lot A)	—	7 2	10 5
Value realised per gallon of separated milk	—	4.7d.	3.4d.

It will be seen that the expectation that the value realisable for the milk would tend to rise as the daily allowance per head was reduced was clearly demonstrated by the results of this experiment.

The values arrived at for the separated milk include any

profit accruing from the extra meal consumed by Lots B and C and are comparable with the results obtained by the first method of computation applied to the results of Experiment XIII. On the other hand, the basal meal ration in Experiment XIV included soya meal, so that the margin for improvement by the addition of milk would be less than in Experiment XIII.

If we combine the results of the two experiments, then with bacon pigs at 10s. per score and meal rations at 7s. per cwt. the values realisable for separated milk on the basis of our experimental data are as follows:—

When given at the rate of 4 pints per head per day	Per gallon.
" " " " 2 " " " " "	2·8d.
" " " " 1 " " " " "	3·4d.
" " " " 1 " " " " "	4·7d.

In practice the allowance will be determined by the amount of milk and the numbers of pigs available, but it is clearly a sound economic policy to spread the milk over as many pigs as possible, even though the allowance per head fall as low as 1 pint daily.

On the further point as to whether preference should not be given to the younger pigs, the following experiment was carried out.

Experiment XV. (May 29 to October 15, 1930) (139 Days).

For this experiment three Lots of eight Large White pigs each were used, of average age about 13½ weeks, and average initial weight per pig about 50 lb., for each Lot. The meal mixtures fed were the same for each Lot, and consisted of barley, tapioca and soya meals, sharps and minerals. Apart from small differences in the weights of meal consumed the only variations in treatment between the Lots lay in the periods over which separated milk was supplied, which were as follows:—

Lot A received 2 pints per Pig daily for the first six weeks.	
Lot B " " " " " " " " " "	twelve "
Lot C " " " " " " " " " "	eighteen "

For the whole period the average growth and food consumption data were as follows:—

	Lot A. lb.	Lot B. lb.	Lot C. lb.
Average Initial Live Weight per Pig	52·3	49·4	48·7
Average Live Weight Gain per Pig	174·4	182·4	185·5
Average Meal consumed per Pig	661·7	639·4	649·6
	Pints.	Pints.	Pints.
Average Separated Milk consumed per Pig	84	168	252

It will be noted that, contrary to expectation, there is hardly any significant difference between the three average live-weight gains, so that apparently little if any advantage accrued from the longer periods of milk supply to Lots B and C. That the milk feeding had a beneficial effect in the first 6 weeks is clear if we compare the results with those of Lot A in Experiment XIV (p. 33) which was in progress at the same time (although started a month earlier), and in which the average initial size and age of pig were almost identical. This Lot, which did not get separated milk at any stage showed an average live-weight gain of 161 lb. in 147 days, or 1.09 lb. per day, whilst in Experiment XV the average daily gains were 1.25 lb., 1.31 lb., and 1.33 lb. for Lots A, B and C respectively. The last-named figure moreover is practically identical with the average daily gain (1.34 lb.) shown in Experiment XIV by Lot C, which also received 2 pints of separated milk per head daily throughout the test.

On the face of the results for Experiment XV it would appear that there was little advantage, if any, in continuing the milk to the pigs after they reached the average age of about 20 weeks. Before we can accept this view, however, we must compare the results obtained with the three Lots in each of the three periods into which the milk-feeding was divided. The relevant data are set out below, along with the corresponding data for Lot A in Experiment XIV,¹ which indicate what might have been expected if no milk at all had been fed.

Average Gains in Live Weight per Pig.

	Experiment XIV.	Experiment XV.		
	Lot A. lb.	Lot A. lb.	Lot B. lb.	Lot C. lb.
First six weeks . . .	29.3	50.3	51.0	51.4
Second six weeks . . .	55.0	46.6	52.7	51.2
Third six weeks . . .	49.3	56.9	57.8	65.7

These figures throw considerable light upon the effects of the milk. Firstly there is close agreement between the three Lots of Experiment XV during the "first six weeks" period when all were treated exactly alike, receiving 2 pints separated milk per head per day. In this period, moreover, the pigs put on nearly twice as much live weight as did the pigs of Lot A (no milk) in the corresponding period of Experiment XIV.

In the "second six weeks" period Lot A fell behind Lots B and C which were still being treated alike and getting the milk.

¹It must be noted that Experiment XIV started a month earlier than Experiment XV, so that the actual six-week periods compared are not the same in the two experiments. The comparison is only intended, therefore, as a rough guide to what might have been the average gains in Experiment XV if no milk had been fed.

The rate of gain for this period, however, was disappointing in comparison either with the previous six weeks or with the "second six weeks" period of Experiment XIV. No reason for this check in growth rate was apparent, save possibly the large numbers of visitors passing through the piggery almost daily during this period!¹

In the "third six weeks" period the only Lot still receiving milk was Lot C, and it will be noted that this Lot gave distinctly better gains than Lots A and B, which agreed closely for this period.

It is clear, therefore, that the milk continued to exercise an effect in the middle and final periods of the experiment, but it is equally clear that the effect was a diminishing one, and that consequently the milk was less profitable in the later than in the earlier stages. The actual values per gallon realised for the separated milk by the three Lots can only be roughly assessed, and in view of the rather small number of pigs per Lot and the irregularities of growth the figures could have little value. It is sufficient, however, to have the qualitative demonstration given by this experiment that milk is likely to be more profitably disposed of by young pigs than by older pigs, provided the daily allowance is kept within limits suited to the pigs' capacity.

THE ECONOMIC VALUE OF POTATOES IN PIG FEEDING.

The disastrous collapse of the potato market in the winter of 1929-30 brought us many enquiries for advice on the economic possibilities of marketing potatoes through the pig. A good deal of information was already available on this point, but it was felt that a demonstration would be timely, and might serve as a check upon the older results, many of which had been obtained under conditions differing appreciably from the common practice of to-day. As the object of the experiment was primarily economic it was thought desirable to test the economy of utilisation of the potatoes at three different levels of supply, which might be roughly described as low, medium and high. Although "strong stores" are usually selected for potato feeding it was decided to start the experiment with pigs about 12 weeks old in order to get data for the value of the potatoes at all stages of growth.

Experiment XVI. (February 27 to August 11, 1930) (165 Days).

Forty Large White \times Middle White pigs were purchased and divided into four Lots of ten pigs each. The pigs averaged

¹ A similar check was in fact recorded by Lot C in Experiment XIV during the same period (early June to mid-August), which is the height of the visiting season at the College.

about 12 weeks old at the start, and the individual weights ranged from 35 lb. to 53 lb. Lot A served as Control Lot, receiving meals only, the ration used being a mixture of barley meal (3 parts), tapioca flour (3 parts), sharps (2 parts), extracted soya meal (1 part) and minerals (3 per cent.). The minerals at first consisted of limestone and salt only, but from the 17th week part of the limestone was replaced by steamed bone flour. No apparent improvement followed this change and it is unlikely that there was a shortage of phosphorus at any stage. Lot B received the same meal ration, except that one-third of the barley and tapioca was replaced by potatoes in the proportion of 4 parts of boiled potatoes in place of 1 part of meal. With Lot C two-thirds of the barley and tapioca was replaced by boiled potatoes in the same proportion, whilst with Lot D the barley and tapioca were removed from the ration entirely and replaced by boiled potatoes in the same proportion as with Lots B and C. The feeding scheme may thus be summarised as follows:—

	Lot A. Parts.	Lot B. Parts.	Lot C. Parts.	Lot D. Parts.
Barley Meal	3	2	1	—
Tapioca Flour	3	2	1	—
Potatoes (boiled)	—	8	16	24
Sharps	2	2	2	2
Soya Meal	1	1	1	1
Minerals	3 per cent.	3 per cent.	3 per cent.	3 per cent.

The potatoes used were taken straight from the field clump and thus consisted of mixed ware, seed and chats. They were weighed out after cooking, but a rather more correct equivalence with the replaced barley and tapioca meals would probably have been given if the substitution had been made on the basis of 4 parts *raw* potatoes (or $4\frac{1}{2}$ parts cooked potatoes) to 1 part of meal.

Lot D very soon fell behind the other Lots, the ration of potatoes being clearly too heavy and bulky for the young pigs; at all stages of the test, indeed, the allowance of potatoes to this Lot proved to be too great to permit of the same food consumption as was attained with the other Lots. Difficulties experienced with this Lot during the last five weeks caused it to give very poor results for that period. Lots A and B made practically equal progress as judged by the weighbridge, but the Lots receiving potatoes always lacked "bloom" in comparison with Lot A, this being especially noticeable during the early weeks.

After 145 days' feeding Lots A, B and C were disposed of, but Lot D were not fit for disposal until twenty days later. A summary of the weight and food consumption data is tabulated below:—

	Lot A. (No Potatoes) (145 days). lb.	Lot B. (Low Potatoes) (145 days). lb.	Lot C. (Medium Potatoes) (145 days). lb.	Lot D. (High Potatoes) (105 days). lb.
Average Initial Weight per Pig	41.1	43.3	43.8	42.1
Average Live Weight Gain per Pig	182.4	177.7	170.4	166.5
Average Carcass Weight per Pig	171.6	166.6	159.0	151.1
Average Weight Meal consumed per Pig	702	538	387	286
Average Weight Boiled Potatoes consumed per Pig	—	733	1,327	2,411
Average Weight "Meal Equivalent" * consumed	702	721	719	889
Weight "Meal Equivalent" per 1 lb. Live Weight Gain	3.85	4.07	4.22	5.33

* Taking 4 lb. potatoes = 1 lb. meal.

The differences in live-weight gain between Lots A, B and C are only small, but show a gradual falling-off in rate of growth as the proportion of potatoes in the ration is increased. This is partly due to the bulky nature of the potatoes and partly to the slight underestimate of the amount of boiled potatoes required to replace 1 lb. of mixed barley and tapioca meals.

In attempting to arrive at the value realised for the potatoes under the three systems of feeding it is necessary to bring into account the cost of cooking them. This was high, owing to lack of convenient appliances for the cooking, which made it impossible to deal with more than about 1 cwt. at a time. A total of 18 tons of potatoes was used and the costs of boiling worked out as follows:—

	£	s.	d.
Labour, 286 hours at 8½d.	10	2	11
Coal, 30 cwt.	2	6	1
Incidentals	0	9	6
Cost of boiling 18 tons	12	18	6
„ „ „ 1 ton	0	14	4

The cost per cwt. of the meals used varied from an average of 8s. 9d. for Lot A to 8s. for Lot D. The fat pigs realised an average price of 15s. per score dead weight. The pigs cost initially 47s. 6d. each, and labour and other charges may be taken at 4d. per pig per week. The comparison of returns per pig then works out as follows:—

	Lot A. s. d.	Lot B. s. d.	Lot C. s. d.	Lot D. s. d.
Costs—				
Initial Cost of Pig	47 6	47 6	47 6	47 6
Meals	54 10	41 4	29 1	20 6
Cooking of Potatoes	—	4 3	7 9	14 0
Labour, etc.	7 0	7 0	7 0	7 10
Total Costs (excluding Potatoes)	109 4	100 1	91 4	89 10
Receipts—at 15s. per score	128 8	124 11	119 3	113 4
Surplus	19 4	24 10	27 11	23 6

	lb.	lb.	lb.	lb.
Weight raw potatoes fed *	—	660	1,194	2,170
Value realised per ton raw potatoes	--	84s. 3d.	52s. 5d.	24s. 3d.

* 9 lb. raw potatoes = 10 lb. cooked.

In noting the relatively high returns shown by Lots B and C it must be remembered that the method of assessment of the values realised for the potatoes gives them the whole profit of the feeding; if a profit is demanded upon the meals used for Lots B, C and D, the returns for the potatoes will, of course, be greatly reduced, as is clear from the useful surplus realised on meals alone by Lot A. Where the problem is one of finding an alternative method of selling the potatoes, however, our method of assessment would seem to be reasonable.

The results bring out clearly the greater economy of feeding the potatoes in small rather than large allowances. The higher economy of the small ration of potatoes would be offset in practice by the low tonnage of potatoes consumed, or alternatively the large number of pigs and heavy capital outlay required to dispose of a large tonnage. At the other extreme a heavy ration of potatoes empties the "clamp" more rapidly but does not secure the full feeding value of the potatoes. As a practical feeding policy the medium allowance of potatoes would therefore seem to be the most feasible, and under the conditions of our experiment—with young "stores" at 47s. 6d., meals at 8s. 6d. per cwt. and fat pigs at 15s. per score—would secure for the potatoes a gross return of 50s. to 55s. per ton. Under present price conditions the return would be much less, *e.g.*, with "stores" at 25s., meals at 7s. 6d. per cwt. and fat pigs at 10s. per score, the value realisable for the potatoes fed in medium quantities would be only about 25s. to 30s. per ton.

THE INFLUENCE OF MAIZE GERM ON THE QUALITY OF BACON.

It is the common experience of bacon curers that the fat from pigs that have received large quantities of maize is liable to be soft and oily and to turn yellow on keeping. This effect is commonly attributed to the oil of the maize which is largely located in the germ. If this view is correct one would expect that degermed maize would be less detrimental than ordinary maize in the above respect. A series of experiments to test this point was organised by the Pig Feeding Experiments Committee (*cf.* p. 14) in the winter of 1927-28, and experiments were subsequently carried out at the Harper Adams Station and two other centres. Detailed publication of the results of these experiments must be reserved for the joint report that will shortly appear elsewhere and only a summary of the main features of the Harper Adams experiment can be given here.

This experiment was carried out in the spring and summer

of 1928 and comprised comparisons of yellow and white maize, with and without germ, as well as comparisons of flaked yellow and white maize against the raw meals. The numbers of pigs were too small to give reliable measurements of the relative merits of the different forms of maize so far as their effects on the rate of growth of the pigs were concerned, but the degermed maize appeared to be fully equal to the ordinary maize in this respect, whilst the cooked maize gave rather better growth than the raw maize.

In their effects upon quality of bacon fat the degermed forms of maize were definitely superior to the ordinary maize with germ, although the differences were only small. The best quality was obtained on the whole with flaked degermed white maize, followed by flaked degermed yellow maize, whilst the lowest quality was given by ordinary yellow maize meal (including germ). In view of the smallness of the differences, however, it seems probable that the maize oil is only one of several factors that contribute to the production of oiliness in maize-fed bacon. The results at the other centres (Cambridge and Northern Ireland) where similar experiments were carried out, were substantially in accord with these conclusions.

MISCELLANEOUS TESTS.

In addition to the lines of experiment detailed in the foregoing pages other matters have been under observation at the Station during the past five years. In most cases the observations have been of a preliminary character and may be briefly summarised.

The addition of cod-liver oil to the rations of feeding pigs has never produced any measurable effect, either beneficial or otherwise.

A similar lack of response has been experienced in tests of the addition of very small quantities of potassium iodide to the rations of both feeding pigs and in-pig sows. Under our conditions of housing and management there has never been any sign of deficiencies of either vitamins or iodine, or any other mineral ingredients, except lime and salt.

THE AVERAGE GROWTH RATES OF PIGS OF LARGE WHITE TYPE UNDER FATTENING CONDITIONS.

It is the practice at the Harper Adams Station to weigh all pigs weekly. In the case of pigs bred from the Station herd of Large White sows the weight of each pigling is taken at one day old and subsequently at weekly intervals. Pigs that are purchased from time to time are partly pure-bred Large Whites, or more commonly first- or second-crosses of Large White type. A considerable mass of data, relating mainly to Large Whites, has thus been accumulated, from which the average weights at

different ages are calculated each year. The averages up to the end of September, 1931, are given below. No data are given beyond 32 weeks old, as from 28 weeks onwards the data begin to be affected by the drafting out of the best pigs.

It must be kept in mind that, apart from obvious "wasters," every pig is included in these records, which means not only many that were intrinsically "bad doers" but also others, quite good in themselves, that for purposes of experiment had been fed on rations which were known to be unsatisfactory. It may perhaps be claimed therefore, that the data will serve as a guide rather to the ordinary pig-feeder than to the specialist, and represent the average rates of growth that may be expected in practice; some will do better, many do worse. It should be noted further that the pigs have been continuously fed for increase from weaning to bacon weights without any "store" period.

Summary of Growth Records.

(Average of data to September 30, 1931.)

Age.	No. of Pigs.	Live Weight. lb.	Age.	No. of Pigs.	Live Weight. lb.
1 day	635	3.0	17 weeks	521	71.6
1 week	654	5.5	18 "	520	77.5
2 weeks	654	8.5	19 "	509	86.8
3 "	639	10.9	20 "	514	93.1
4 "	623	13.5	21 "	504	103.1
5 "	592	16.0	22 "	509	109.3
6 "	565	18.9	23 "	507	118.3
7 "	559	22.2	24 "	507	127.9
8 "	532	25.9	25 "	503	136.8
9 "	518	29.4	26 "	502	145.9
10 "	537	33.4	27 "	487	155.8
11 "	531	37.0	28 "	479	165.5
12 "	531	41.4	29 "	464	173.6
13 "	506	49.2	30 "	452	181.0
14 "	515	51.6	31 "	445	192.9
15 "	518	57.6	32 "	387	199.0
16 "	521	65.1			

SUMMARY OF RESULTS.

1. In experiments with groups of ten pigs an allowance of fully 10 per cent. of the live weight increase must be made for normal variation.

2. A ration of cereal meals is deficient in proteins and certain minerals for the needs of the rapidly growing pig.

3. Extracted soya meal, when supplemented by suitable minerals, will give as good results as fish meal when added to a cereal ration. In one experiment decorticated groundnut meal and bean meal (plus minerals in each case) also gave equally good results, but with the last-named much higher proportions need to be used to provide the necessary amount of protein.

4. An average proportion of about 8 per cent. of soya meal in rations is adequate. This is best secured by using about 12 per cent. in the ration for the newly weaned pig, and gradually reducing this to a minimum of about 5 per cent. at bacon weights.

5. The only minerals required to be added to rations of cereal meals and soya meal are limestone and salt. An allowance of $1\frac{1}{2}$ lb. limestone and $\frac{1}{2}$ lb. salt per 100 lb. mixed meals is adequate. An even smaller allowance of salt is probably sufficient.

6. Tapioca root flour of high quality is an excellent starchy food for pigs, and in a "balanced" ration is equal in feeding value to maize meal. It gives a better quality of bacon fat than the latter.

7. Degermed maize is equal in feeding value to ordinary maize, and gives a rather better quality of bacon. Flaked maize is slightly superior in both respects to ordinary uncooked maize. White maize gives rather better quality bacon fat than yellow maize.

8. Dried sugar-beet pulp may be included in rations for feeding pigs up to about 20 per cent. of the total food supply. Provided the ration is "balanced" as regards protein, the beet pulp is equal in feeding value to wheat sharps. To secure the "balance" the beet pulp should be mixed with about 10 per cent. of its weight of extracted soya meal.

9. The water requirements of the sty-fed pig are satisfied under normal conditions by the supply of about 3 lb. water per 1 lb. meal for young pigs, reduced gradually to a final proportion of about $1\frac{3}{4}$: 1 at bacon weights. A little more water may be necessary in hot weather.

10. The economic value of milk in pig-feeding varies with a number of factors, *e.g.*, cost of store pig, price of meals, price obtainable for fat pigs, and the rate of live-weight gain secured by the feeding.

A table is given showing the estimated value per gallon realisable for separated milk fed at the rate of $\frac{1}{2}$ -gallon per head per day at various prices of foods and fat pigs.

Whole milk gives a higher rate of gain than separated milk, but the financial returns are lower than those obtainable by feeding the latter in conjunction with butter-making or cream-selling.

11. The returns obtainable by feeding separated milk tend to increase—

(a) by reducing the allowance per head

(b) by feeding it to younger rather than to older pigs.

12. The financial returns obtainable for potatoes fed to pigs are subject to the influence of the same factors as those enumerated under 10 and 11 for milk. Not more than two-thirds of the

concentrated starchy foods (*e.g.*, barley, maize, tapioca) in the ration should be replaced by potatoes.

Four pounds of raw potatoes may be taken as equal to one pound of mixed barley and tapioca meals. This is equivalent to about $4\frac{1}{2}$ lb. of cooked potatoes.

13. Under the system of housing and management of the Harper Adams Station no deficiencies of vitamins or iodine appear to arise.

14. A table is given showing the average live weight of pigs of Large White type recorded at the Station from 1 week to 32 weeks old. These pigs have been continuously fed up to bacon weights without any store period.

I would take this opportunity of expressing my great indebtedness to my assistants, Mr. I. Fullerton, N.D.A., and Mr. T. S. Wright, N.D.A., who have been entirely responsible for the practical side of the experiments dealt with in this Report and for the keeping of the records.

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ERADICATION OF TUBERCULOSIS FROM CATTLE HERDS.

It is common knowledge that tuberculosis is the cause of serious losses in the cattle industry of this country, particularly in dairy herds, and that the presence of this disease amongst dairy stock constitutes a menace to the health of children and is a hindrance to the increased sale of fresh milk. It follows, therefore, that the question of the eradication of this disease from our cattle herds is a matter deserving the most serious attention of stock owners, and of all engaged in the production and distribution of milk.

The object of this article is to describe and consider the various methods and schemes which have been suggested as aids to eradication. In order that the nature and extent of the problem may be understood, the prevalence of tuberculosis amongst cattle, and particularly amongst dairy stock, is first summarised, then the chief measures which have been taken to reduce its incidence in this country and the eradication methods adopted in other countries are discussed. Finally, consideration is given to the more comprehensive measures which have been suggested for adoption in this country.

The subject is so large and so much has been written from

different points of view that it has not been possible to do more than refer briefly to many points. Detailed references, therefore, have not been given throughout this article, but a list of the publications consulted is given at the end for the information of those who wish to study the subject more fully.

PART I.

INCIDENCE OF TUBERCULOSIS AMONGST CATTLE.

The prevalence of tuberculosis amongst cattle is estimated from information obtained by the application of the tuberculin tests, by slaughter-house examinations and reports, and by the routine veterinary inspection of dairy herds. From the point of view of the cattle owner this information will be discussed under the following heads.

Proportion of Reactors.—The number of herds which have been subjected to one or other of the different tuberculin tests constitute only a small proportion of the cattle stock of the country and, of those which are tested, in many instances the results are not available for the computation of the proportion of reactors. Nevertheless, sufficient information is available to show that the incidence of the disease varies very considerably from herd to herd and also from district to district. In dairy herds the proportion of reactors has been found to range from less than 10 per cent. to over 80 per cent. ; as a rule, the infection is lowest in herds mainly composed of young cows reared on the farm and kept as much as possible out of doors, and highest in herds largely maintained by purchase and consisting mainly of older cows housed day and night during the winter. In beef herds little information is available as to the prevalence of the disease, but where cows are kept under healthy open-air conditions the amount of infection should not be high.

There is also a marked variation in the proportion of reactors found in different age groups. No recent figures on this point are available, but those published by Delepine in 1912 illustrate the increase of infection with age :

Age in years	.	.	.	0-1	1-2	2-3	3-5	5-9	9-13	Total
No. examined	.	.	.	29	68	112	51	94	25	379
Percentage tuberculous	.	.	.	3.4	13.2	24.1	23.5	48.9	76.0	30.5

It should be noted that while the application of the tuberculin tests usually allows the animals tested to be classified into "non-reactors" and "reactors," the tests do not, in the case of the latter, give any indication of the degree of infection present ; further, animals that are heavily infected may not show any definite reaction. Other points in connection with the tuberculin tests will be discussed later.

Proportion of Infected Animals found by Slaughter.—The information obtained from the abattoirs in a number of large cities gives some measure of the amount of infection existing amongst the different classes of cattle. The following figures, quoted by Savage, show the results obtained in London and Edinburgh respectively.

Animal	CITY OF LONDON Average of 9 years		EDINBURGH 1926		EDINBURGH 1927	
	No. Slaught- ered	Percentage Tuber- culous	No. Slaught- ered	Percentage Tuber- culous	No. Slaught- ered	Percentage Tuber- culous
Bulls . . .	380	9.00	476	15.33	602	12.62
Calves . . .	20,880	0.17	4,818	0.24	4,936	0.67
Cows . . .	630	33.00	3,479	46.50	3,687	42.99
Heifers . . .	902	12.60	747	7.89	953	5.67
Oxen . . .	7,451	2.50	27,187	3.88	28,045	3.73

The low percentage of calves and oxen and the high percentage of cows affected is worthy of note, but in respect of the Edinburgh figures it is stated that, "the majority of the cows are affected with the disease in only a minor degree."

Proportion of Cases of Udder Tuberculosis.—Cows suffering from tuberculosis of the udder, and consequently producing milk containing live tubercle bacilli, are the greatest source of danger from the public health point of view, and are also a main source of infection of calves. Frequently a tubercular udder can be diagnosed with certainty, but a considerable proportion of cases have been found where the milk contained live bacilli yet no symptoms of the disease could be detected in the udder. The proportion of cows thus affected cannot be accurately determined, but the most recent estimates, based on reports from city slaughter-houses and from veterinary surgeons carrying out routine inspections of dairy herds, indicate that the proportion of cows with tuberculous udders is from 0.2 to 0.3 per cent., i.e., 1 in every 350 to 500 cows.

Cows which are suffering from open tuberculosis in organs, other than the udder, may, and no doubt often do, infect other animals, and the proportion of such cases is estimated to be from 1 to 2 per cent. When such animals are present in a herd and where strict cleanliness is not practised, there is the risk that milk may become infected from contaminated manure and dust.

Proportion of Infected Milk Samples.—This article is mainly concerned with tuberculosis in cattle, but the presence of tuberculous bacilli of bovine origin in market milk supplies must

receive adequate consideration because of the menace of such infection to the health of children. The examination of mixed milk samples for tuberculous bacilli carried out by local health authorities give some indication of the proportion of infected market milk samples. The proportion naturally varies according to the incidence of undetected cases of open (mainly udder) tuberculosis in the herds supplying the milk, the extent to which the milk is mixed or bulked before delivery and whether adequate pasteurisation is adopted, and considerable variation is found in different parts of the country. The average proportion of infected samples is from 6 to 7 per cent.

Summary.

- (a) The proportion of cows in dairy herds which will react to the tuberculin tests ranges from less than 10 per cent. to over 80 per cent. The average is estimated to be about 40 per cent.
- (b) The proportion of slaughtered animals found to be tuberculous varies according to class of animal. The incidence is highest in cows, and lowest in calves and oxen.
- (c) The proportion of dairy cows with infected udders is from 0.2 to 0.3 per cent., and the proportion of "open" cases in dairy herds is between 1 and 2 per cent.
- (d) The proportion of samples of mixed milk found by local health authorities to contain tubercle bacilli is from 6 to 7 per cent.

PART II.

STEPS TAKEN TO REDUCE BOVINE TUBERCULOSIS.

The survey of the present position given above indicates the magnitude of the problem of eradication. Indeed it may seem that eradication in the true meaning of the word is an impracticable and unrealisable vision, since more than one-third of the milking stock of the country suffers from the disease to a greater or lesser extent.

There is no doubt that the prevalence of tuberculosis, not only amongst cattle, but also amongst pigs, and the susceptibility of both classes of animals to infection has prevented any organised attempt being made to attain complete eradication; but certain steps have been taken by the Ministry of Agriculture and the Ministry of Health to lessen the incidence of tuberculosis by dealing with the most dangerous cases. It is desirable that these steps should be briefly described and discussed before proceeding to consider what might be done on a broader basis.

The Tuberculosis Order of 1925.—This Order was made under the Diseases of Animals Acts, 1894–1925, and became operative

on September 1, 1925. Its object, according to the circular issued with it, is "the destruction of every cow suffering from tuberculosis of the udder or giving tuberculous milk, and every bovine animal suffering from tuberculous emaciation or suffering from a chronic cough and showing definite clinical signs of tuberculosis." The animals referred to in the above paragraph are more fully described in the Order as follows :

- (1) Any cow which is, or appears to be, suffering from tuberculosis of the udder, indurated udder or other chronic disease of the udder.
- (2) Any bovine animal which is, or appears to be, suffering from tuberculous emaciation.
- (3) Any bovine animal which is suffering from a chronic cough and showing definite clinical signs of tuberculosis.

The methods by which it is hoped the destruction of such animals will be obtained is the compulsory notification of the possession of any animal so infected, by the owner or person in charge, to a police constable or inspector of the local authority ; further, a veterinary surgeon, who in his private practice detects any animal so affected, must notify an inspector of the local authority as soon as possible. When an animal is reported, it is examined by a veterinary inspector appointed by the Local Authority, and if he considers that it comes within the scope of the Order, the animal is slaughtered and compensation is paid to the owner at a rate depending on the condition of the animal. The Order also specifies that the milk produced by any suspected cow shall not be mixed with other milk and shall be boiled or otherwise sterilised for a specified period.

This Order has been in force for fully six years, and sufficient time has now elapsed to enable an opinion to be formed as to how far it has succeeded in reducing the proportion of dangerously infected cattle.

At the World's Dairy Congress held in London in 1928, and on numerous other occasions, the opinion has been expressed by veterinary surgeons and others that, although a considerable number of animals are dealt with annually according to its provisions, the Order has failed to attain its main object. The chief cause of failure is that the great majority of the cattle reported and dealt with under the Order are seriously affected and have been in a highly infectious condition for some time previous to notification ; in other words, they have done almost the maximum harm of which they are capable, as active centres of infection, before they are reported.

This delay in reporting suspicious cases means that herds which have had one or more animals affected are likely to have a succession of such cases at intervals ; at the same time the

buildings, pastures and water-supply of the farm will become contaminated and the difficulties of maintaining a healthy herd on such a farm become intensified year by year. As the compensation received is small (approximately 30s.) when the animal killed is found to have been suffering from "advanced tuberculosis," it would seem to be to the advantage of owners to report suspicious cases earlier with a view to receiving compensation more in harmony with the original value of the animal, and to lessen the risk of infecting other stock on the farm. This course is rarely if ever adopted for the following (amongst other) reasons: (a) In some herds the presence of "wasters" is accepted as a natural sequence to maintaining a dairy herd, and the almost total loss of several cows annually is expected—(why fight against the inevitable!); (b) the owner or person in charge does not recognise the dangerous symptoms, and even when the udder is affected, the animal is kept in the herd in the hope that it will soon recover; (c) the precautions to be adopted with respect to the milk of a cow reported under the Order require that the milk shall not be mixed with other milk and must be boiled until either six weeks after the examination of the cow by a veterinary inspector, or until the owner is notified that no further precautions are necessary. The six-weeks period is required to enable a reliable biological test of the suspected milk to be carried out, but should this test prove negative and the cow in question not be subject to the Order in other respects, no compensation is paid to the farmer for the milk he has had to withdraw from sale during this period. This appears a real hardship to the dairy farmer producing milk to meet uniform requirements and does not encourage him to report suspicious animals giving an appreciable daily yield of milk. There is also evidence that local authorities do not encourage attempts to discover and report suspicious cases because of the additional expense incurred.

It will be obvious from the above criticism that the Tuberculosis Order, 1925, does not attain its main objects and cannot, as at present drafted and operated, play any great part in the eradication of even the dangerous cases of tuberculosis from our herds. Improvements of the Order have been suggested from time to time, and in this connection it appears desirable to quote the considered opinion of Dr. Savage, Medical Officer of Health for Somerset. He says "the essential defect of administration is that, so far as I have been able to study its working, the endeavour has been to work it as cheaply as possible and not as a *preventive* measure. Any other way of working it, although costing less per year, seems very extravagant in proportion to the results achieved.

"Some of these administrative improvements may be

mentioned. The burden of notification is mainly on the farmer. How can he be expected to notify early enough to be of preventive value unless he is first persuaded that it is to his benefit to get these animals caught early, and unless he is educated as to what to look out for as regards physical signs? The cow-owner should be required to notify all cases suspected to belong to one of the three designated groups. The authority should be willing and anxious (not reluctant) to provide free veterinary examination for such suspicious cases. As a natural corollary, any owner found to have an animal in an advanced stage of tuberculosis, which he should have (and did not) reported as a suspected animal, should be fined and no compensation paid for slaughter. This would increase his interest in the problem.

"The examination of all contacts which are milch cows (not all bovines) should be a matter of routine and not left to the discretion of the veterinary surgeon. The use of bacteriology as an aid to diagnosis should be encouraged and facilitated. The disinfection of premises after slaughter should be put on a reliable basis.

"In particular, the Order must be administered as a preventive measure and under the guidance of an expert who looks at it from a preventive standpoint. At least one whole-time veterinary surgeon trained in this kind of work should be employed in every large county, both to act as such an expert adviser and to carry out part of the actual examinations."

Milk and Dairies Acts.—Certain sections of the Milk and Dairies (Consolidation) Act, 1915, and the Milk and Dairies (Amendment) Act, 1922, give local health authorities power to stop supplies of milk which are likely to cause tuberculosis, and to have the herds which come under suspicion inspected and samples of milk taken by a veterinary surgeon. In the event of animals being found yielding infected milk they are presumably dealt with under the Tuberculosis Order referred to above. Owing to the bulking or mixing of milk which takes place previous to delivery in large towns and cities it is often impossible to trace the source of an infected sample, and the procedure permissible under these Acts is of very little value in detecting tuberculous cows.

The Milk and Dairies Order, 1926, made under the Milk and Dairies (Consolidation) Act, 1915, which came into operation on October 1, 1924, requires every county council and county borough council to have such inspections of cattle made as may be necessary and proper for the purposes of the above Acts and Order.

Routine Veterinary Inspection.—It would appear from the above that regular inspection of all dairy cows was made a duty

of the county authorities, but a circular issued to county councils in January, 1927, made it clear that routine inspection of all cows was not essential as long as all the necessary inspections were made in cases where the presence of cows producing tuberculous milk was suspected. Several county councils in England have, however, instituted routine veterinary inspection of all cows, usually at six-monthly intervals, and there is evidence that such inspection leads to the discovery of dangerous cases at an earlier date than would otherwise be the case. In this way routine inspection can lessen the number of active centres of infection, but because the animals have to be infected before they can be discovered, it cannot of itself bring about the eradication of bovine tuberculosis. An adequate system of regular veterinary inspection can, however, play a great part in raising the health standard of herds, if it includes not only the inspection of animals, but also the provision of advice to herd owners on improvements in housing, disinfection of premises, methods of isolation and means of lessening infection from tuberculosis and other diseases. Indeed, the development of some such inspection and advisory service would appear to be an essential preliminary to the introduction of any national scheme for the eradication of tuberculosis.

Tuberculin Tested Herds by Means of the Milk (Special Designations) Order.—The Milk and Dairies (Amendment) Act, 1922, and the Milk (Special Designations) Order made under it also require mention because they enable a producer of milk who complies with certain conditions regarding the freedom of his herd from tuberculosis, as determined by the tuberculin test, and with certain other conditions regarding the cleanliness and method of delivery of the milk, to obtain a licence from the Ministry of Health permitting him to use the special designations—Certified or Grade A (Tuberculin Tested) Milk.

The main object of the above Order is to enable those who wish to supply milk produced in a manner which complies with its conditions to obtain official recognition, i.e., it is designed to ensure the freedom from tuberculous infection of a small proportion of the milk supply rather than to encourage the formation of tubercle-free herds. Since, however, the conditions permit (*inter alia*) only herds in which every animal has passed a prescribed tuberculin test at intervals of six months to obtain a Certified or Grade A (Tuberculin Tested) Milk licence, those that have obtained such a licence constitute the only herds in the country which have any official recognition in this respect. Further, as the cattle stock of this country exists in units of herds, the process of eradication of tuberculosis must proceed on a herd basis. From this point of view the "licensed herd" or "graded milk" movement is important as it is at present

the only means whereby tubercle-free herds can obtain the recognition of an independent authority.

In addition to the herds licensed under the Milk (Special Designations) Order, there are others where the herd owners have taken steps to eradicate the disease. The methods adopted and rate of progress have depended on the proportion of reactors found at the first test, the financial position of the owner and the value of the individual animals for breeding purposes. Numerous difficulties have had to be overcome and disappointments have been numerous and serious. It appears obvious that, if any real progress is to be made, the work must not be left to the unorganised efforts of individuals, but must be taken up according to a carefully thought out scheme on a national basis.

Summary.

The measures taken under the Tuberculosis Order, 1925, to detect and destroy all animals suffering from "open" tuberculosis have failed to attain their object in time to be of real value. Action taken under the Milk and Dairies Acts to discover and destroy cows yielding tuberculous milk often cannot be effective because of the extreme difficulty in finding the affected animal. Inspection of herds as indicated in these Acts is rarely carried out in a systematic manner. The Tuberculosis Order must be amplified and the inspection of herds carried out generally and systematically before any real progress can be made towards the eradication of tuberculosis. The Milk (Special Designations) Order has been helpful by providing the only official recognition at present available in this country for herds which have been tested and contain no reactors.

PART III.

ERADICATION MEASURES ADOPTED IN OTHER COUNTRIES.

The preceding sections of this paper have dealt with the incidence of tuberculosis amongst the cattle stock of this country at the present time, and have summarised briefly the chief measures which have been taken to discover and eliminate "open" cases of infection and to reduce the prevalence of the disease. No claim can be made that any real effort has been made to eradicate the disease and, before proceeding to discuss how this might be done, it seems desirable to consider briefly what courses of action have been followed in other countries.

The incidence of tuberculosis must necessarily be a controlling factor in deciding on the methods of eradication to be adopted. Where the proportion of reacting animals is low it becomes feasible to adopt drastic measures, such as the slaughter of all reactors, without materially influencing the supply and

price of milk and meat, but where the proportion of reactors is high (as in this country) no such policy can be suggested as practicable. The methods adopted in other countries vary therefore according to the prevalence of the disease.

Tuberculin Testing and Slaughter.—In the United States and in Canada, where the proportion of reactors is only from 3 to 5 per cent. (approximately one-tenth that of this country), the main principles of the eradication policy pursued are the testing of herds by tuberculin, with assistance from public funds, slaughter of the reacting animals with compensation and the official recognition of herds which comply with all requirements, including the passing of two successive tuberculin tests at six-monthly intervals without discovering any reactors, under the name of "Accredited Herds." When a sufficient number of such herds has been formed in an area, all other herds are then tested, and when this has been done, the reactors removed, and the other conditions regarding disinfection, &c., complied with the area is described as a Modified Accredited area in the United States or a Restricted area in Canada.

The above policy proceeds in a logical manner, beginning with individual herds, and gradually extending to include an area or areas. It is considered more economical and efficient to work from central points and clean up whole districts rather than widely scattered individual herds. It has been pursued with great success in the United States since 1917 and in Canada since 1919, and there is reason to believe that continued action on the lines indicated will attain the desired result. As already stated, the adoption of a similar policy is not practicable in this country at the present time.

Tuberculin Testing and Separation of Reactors from Non-reactors.—In Denmark and in other countries in Northern Europe, where the proportion of infected stock is approximately the same as in Britain, a testing and segregation policy has been followed intermittently for many years. The initiation of this policy will always be associated with the name of Professor Bang, the noted Danish veterinarian.

Previous to 1892, Bang had been studying the incidence of tuberculosis in Danish herds and had noted that calves, even those from reacting cows, were very rarely infected, and that a large proportion of those cows which reacted suffered from the disease to a limited extent and could continue to milk and breed for a period of years. With this knowledge Bang, in 1892, was in a position to attempt to change a herd of tuberculous cattle into a healthy herd. His method has often been described, but in view of the position in this country at the present time, a repetition of it in his own words is opportune.

"My plan was above all conservative. I hoped to be able

to prove that it was possible to produce a new tubercle-free herd by rearing the calves, even those born of cows infected with tuberculosis, when they were separated as soon as possible from the infected cowshed and were protected against infection through the milk. And I hoped to accelerate the formation of a new healthy herd by testing the old herd with tuberculin and separating the non-reacting animals carefully from the reacting ones. As the great majority of reacting animals were only slightly affected I did not think it necessary to slaughter the reacting cows in the course of a year. Why should such cows not be allowed to remain living and to produce milk and calves as long as they were apparently healthy and showed no symptoms of tuberculosis except the reaction? As soon as they showed clinical symptoms of tuberculosis I wished them to be killed."

The practicability of the plan was proved repeatedly in both large and small herds. Where the owner had two homesteads and one was used for the reactors and the other for the non-reactors and calves, the necessary separation could be carried out without difficulty. Where there was only one homestead, separation was more difficult, but Bang ventures the opinion "that in many cases the small farmer will be more able to accomplish the task, if he has intelligence enough to understand fully the necessary provisions and a strong will to fulfil them."

In 1893 a grant was made by the Danish Government to enable tuberculin-testing to be done free of charge in herds where the owner wished to adopt the Bang method, and numerous farmers began to clean up their herds. After a few years, the numbers diminished partly through a lack of perseverance and partly because, through lack of care in separation, in disinfection and in boiling the milk given to the calves, the expected results were not attained. Further helpful steps were taken by the Danish Government in 1898, when the adequate heating at factories of separated milk, buttermilk and whey intended to be returned to farms for stock-feeding purposes was made compulsory, and it was enacted that all cows found suffering from tuberculosis of the udder must be killed and a partial compensation paid to the owner by the State.

In recent years, there has been a marked increase in the number of herds in Denmark applying the Bang method, and in addition a number of societies of farmers have been formed for the specific purpose of promoting the breeding and maintenance of healthy non-tuberculous herds of cattle and pigs. Several such societies consist of farmers who send their milk to the same co-operative creamery, and it is evident that the spirit and practice of co-operation which has done so much for

the Danish farmer in other respects, can play a great part in freeing their herds from tuberculosis.

In Holland a scheme of compulsory testing, the slaughter of reactors and of clinical cases and the payment of compensation was introduced, but the policy had to be modified on the ground of expense. In 1928 new decrees were passed whereby financial assistance may be given by the Government to associations of cattle owners who wish to combat tuberculosis, for compensation in cases of slaughter and for veterinary inspection; tuberculin may also be supplied, or the bacteriological examination of samples undertaken free or at reduced rates. Several such associations have been in existence in Holland for ten years or more and have done excellent work in promoting a "health service for cattle" in different parts of the country.

Immunisation by Vaccines.—The possibility of controlling bovine tuberculosis by the inoculation or dosing of calves with vaccines containing live tubercle bacilli has been the subject of much experimental work abroad. The most promising results have been obtained in France by the use of a vaccine prepared by Calmette and Guérin. This vaccine (usually denoted the B.C.G. vaccine) has been derived from a virulent strain of tubercle bacilli by artificial cultivation for a period of 13 years (230 generations) in the laboratory, and it is now claimed that this treatment has weakened the virulence of the bacilli so that when injected into cattle or human beings, it will confer a degree of immunity that will give protection against the natural risks of infection. A considerable number of experiments in France and other continental countries have given results supporting the claims made by Calmette, but a series of experiments in Canada has given very conflicting results, and other workers have shown that the view that the B.C.G. vaccine is harmless and non-virulent may have to be revised. It is evident that much research work in the laboratory with carefully controlled complementary experiments under farm conditions will have to be carried out before practical recommendations based on the use of vaccines can be made with confidence.

Summary.

A study of the methods of eradication adopted in the United States and Canada shows that although practicable and highly successful in these countries, the same methods of testing and slaughter of reactors are not practicable in this country by reason of the much greater prevalence of bovine tuberculosis.

The methods adopted in North European countries, where the proportion of infection is similar to this country, are those of testing and separation of the reactors from the non-reactors with a view to the increase in the number of tubercle-free herds. This method has given a partial eradication in the sense that

the number of herds free from reacting stock has been increased. Since eradication must proceed by means of herd units the experience of these countries affords useful hints as to how progress might be made in this country.

Eradication by means of vaccines designed to confer immunity is still in the experimental stage and no practical recommendations can be made at present.

PART IV.

ERADICATION METHODS PROPOSED FOR GREAT BRITAIN.

The need for taking more specific and extensive measures to lessen the prevalence of tuberculosis in the cattle herds of this country has been recognised for many years, and from time to time suggestions have been made for organised action along definite lines.

The Departmental Committee on the Production and Distribution of Milk in its Final Report issued in 1919, recommended that a scheme to assist farmers to eradicate tuberculosis from their herds should be introduced and that such a scheme should provide for :

- (1) The manufacture, distribution and use of tuberculin to be controlled by a central authority.
- (2) The method adopted in the carrying out and the interpretation of the tuberculin test to be standardised.
- (3) Facilities to be provided out of public funds for free tuberculin testing, provided that the farmer can supply satisfactory evidence that he has reasonable facilities for the carrying out of the test and is willing to comply with the necessary conditions laid down for freeing his herd from reactors. A herd which had complied with the specified conditions would be recognised as tubercle-free and a certificate given to that effect. The herd would be subject to periodical re-testing.

This Committee also recommended that such a scheme should be correlated with a system of milk grading which would provide an official guarantee on which a milk producer could base a claim to receive a better price for tubercle-free milk.

It is worthy of note that since 1919 the only official action taken in the direction indicated has been by the Ministry of Health with reference to graded milks. No parallel action has been taken by the Ministry of Agriculture to assist farmers to improve the health standard of their herds.

Scheme of the National Veterinary Medical Association.—In 1930 a more ambitious and far-reaching scheme was issued by the Scottish Branch of the National Veterinary Medical Association, and in 1931 this Association issued a slightly amended

scheme for the eradication of bovine tuberculosis in England and Wales. It is a welcome sign to stock owners and others interested in this subject that a representative association of the veterinary profession should have made this effort to specify how the eradication of tuberculosis might be proceeded with in this country, and the scheme merits careful consideration in order that its good points may be commended and its weak points strengthened.

The scheme is based on a combination of the methods used in America and in Denmark, which have been described in preceding pages. It is recommended that the control of the scheme should rest with the Ministry of Agriculture and Fisheries, and the main features suggested are as follows: that the Ministry should draft conditions governing the procedure for tuberculin testing, that only tuberculin of guaranteed potency should be used and that the possession of tuberculin by laymen should be prohibited; that an annual grant should be made to meet, in whole or in part, the cost of testing and to provide compensation under conditions to be specified by the Ministry for animals slaughtered; that the Ministry should specify the conditions of management, segregation, disinfection, &c., which must be complied with before a herd can be classed as an Accredited Herd, and the conditions of re-testing, &c., in order to continue an Accredited Herd; that, to begin with, suitable herds (such as those with a low incidence of tuberculosis, self-supporting and pedigree or milk-recorded herds), in the possession of owners who have agreed to conform to the conditions, be chosen for participation in the scheme and the initial tests be carried out by practitioners chosen by the owner; that all reactors in herds tested under the scheme should be indelibly marked and disposed of only for slaughter; and that, in process of time, in order to facilitate the maintenance of non-reacting herds in areas where a large proportion of such herds exist, the owners of untested herds within the area shall be compelled to have their herds tested with a view to forming Accredited Areas.

It may be said that the scheme as published is more of an outline than a fully developed scheme; this is true to a large extent, but since the administration and decision as to details must ultimately be mainly in the hands of the Ministry of Agriculture, there is little to be gained at present by amplifying the suggestions regarding degree of segregation, formation of accredited areas, &c. It is also obvious that certain sections of the scheme deal with points of immediate interest while others deal with points that can only arise after several years' experience and progress. For the present, therefore, attention can be most profitably directed to the fundamental points of immediate interest such as the application and interpretation

of the tuberculin test, compensation and the part to be played by the owner of the herds tested under such a scheme.

Tuberculin Tests.—The decision whether an animal is to be classed as a reactor or a non-reactor depends on the application and interpretation of the tuberculin test. The scheme as drafted assumes that no difficulties will arise in this connection provided that only tuberculin of guaranteed potency is used and that the test is carried out according to the manner to be laid down by the Ministry of Agriculture.

Unfortunately the experience of many farmers, who have attempted to free their herds of reactors in order to obtain a licence from the Ministry of Health for the sale of Certified or (Grade A (Tuberculin Tested) milk, or for other reasons, indicates that difficulties will arise and that the position is by no means so simple as the scheme assumes. Until a few years ago the test mainly used was the subcutaneous test, then the ophthalmic test was introduced in addition, and, later, after careful research carried out by the Tuberculin Committee of the Medical Research Council, the double intradermal test was brought into practice; since July 1, 1930, this test only has been accepted by the Ministry of Health in herds applying for the above-mentioned licences. There is evidence to show the greater all-round reliability of the double-intradermal test, although some practitioners continue to prefer the subcutaneous test, but there have been a considerable number of instances where a marked difference of opinion has occurred as to whether an animal was or was not a reactor; in more than one instance the opinion of a local practitioner has not been confirmed when the same animals were examined or re-tested by a veterinary surgeon appointed by the Ministry of Health. The tuberculin test (subcutaneous and double intradermal) has proved invaluable in the detection of infected animals and in the building up of healthy non-reacting herds, but until much greater uniformity and reliability in interpretation can be obtained throughout the country the confidence of farmers will not be gained sufficiently to warrant the introduction of a national scheme of eradication. The question whether the tuberculin testing required for any such scheme would not be more efficiently carried out by full-time veterinary officers engaged by county or other authorities, will also require consideration. If this method were adopted it is probable that the work could be carried out on more uniform lines and that the problems associated with the cost of tuberculin testing or the provision of free testing could also be more easily solved.

Compensation.—When official action is undertaken to reduce or eradicate bovine tuberculosis the question of compensation for animals slaughtered by order always arises. If an animal

has become so badly affected that it is obviously seriously ill it is difficult to see why any compensation should be paid (in so far as such animals are a danger to human and animal health, a severe fine for failure to report them would seem a more suitable measure); but when an animal which appears healthy and in good condition, judged by ordinary farming standards, is found to be in an infective condition, or, according to the scheme under consideration, a reactor, and is slaughtered, compensation in some form is only a matter of common justice. Also, since the operation of such a scheme will provide safer milk and meat for the population as a whole, it seems just that grants for compensation should come from the Government rather than from county authorities. The actual method of arriving at the amount of compensation to be paid can be settled without serious difficulty, but sufficient latitude must be allowed to deal fairly with valuable breeding stock. It should, however, be clearly understood that the payment of compensation for slaughtered reactors is conditional on a definite effort being made by the owner to build up a tubercle-free herd.

The Herd-owners' Part in Eradication.—In one of his articles Bang states that "when the question of combating tuberculosis in cattle is ventilated, in most countries it will be more discussed what the State ought to do than what the farmer must do himself." The State can take steps to secure reliable technique in the tuberculin test, and contribute towards the cost of testing, compensation, and perhaps the provision of temporary accommodation for separation purposes, but these measures will be useless unless the owner is prepared to do his part. He must be prepared to separate reactors from non-reactors at once and to keep them separate to the greatest degree possible under his own conditions, to carry out adequate measures of disinfection of premises which have been occupied by infective animals, and to take such precautions as may be necessary to prevent infection of non-reacting stock from contaminated water supplies, from manure (solid and liquid), from pigs, from stock on adjacent farms and from purchased milk or dairy by-products. Also he must be prepared to rear his calves and young stock under healthy conditions and to build up sound constitutions by adequate feeding.

Many of the above items receive careful attention in the course of ordinary herd management, but there have been instances where great disappointment has been caused by a number of animals reacting after a series of clean tests. In such instances a careful scrutiny will usually show that some precaution has been neglected. If a farmer wishes to co-operate in any eradication scheme or to clean up his herd of reactors independently, he should make a careful study of the precautions,

such as those mentioned above, which will have to be taken to minimise the risk of infection.

Maintenance of Herds by Breeding.—It has also been proved repeatedly that it is infinitely easier to maintain a non-reacting herd where all the young stock needed can be bred and reared on the farm, since the purchase of stock greatly increases the risks of infection. In a recent inquiry conducted by Fowler and Wright in Scotland into the probable sources of infection of reactors found in licensed herds, it was shown that purchased stock were responsible for introducing the infection in 34 per cent. of the cases. Where a herd of cows has been kept of such a size that there is little or no room for the rearing of sufficient home-bred stock, it may well be that the decision to create a non-reacting herd of the same size involves so much worry and risk in purchase that it will be more economical to reduce the cows to a number which permits the farm to rear an adequate proportion of its own stock.

Suggestions as to Future Action.—This article would be incomplete without an attempt to indicate the lines of future action which appear most desirable and appropriate to the conditions which exist in this country. Measures of a more constructive and systematic nature must be undertaken in the near future if Great Britain is to maintain its reputation as the "world's stud farm." Further, the dairy farmers of this country must realise that the continued presence of "open" cases, and particularly cows with infected udders, in their herds, leading to the occasional production of milk containing live tubercle bacilli, lessens public confidence in the safety of milk as a food and is a very definite hindrance to increased sales.

An amendment or amplification of the Tuberculosis Order, to attain greater efficiency in the detection and disposal of "open" cases of tuberculosis, appears to be one of the first requirements, and as this Order is administered by local authorities it appears desirable that these authorities should carry out routine inspections of herds, and that the staff appointed for this work should also be available to advise farmers on general health measures, such as economical improvements in housing, methods of separation, disinfection and precautions to avoid reinfection.

The lack of uniformity in the application and interpretation of the tuberculin tests must be overcome in order that farmers may have more confidence in the results than is often the case at present.

The preparation of a scheme whereby herds of cattle (including both beef and dairy herds) may qualify for entry into an official register of tubercle-free herds, should be undertaken by the Ministry of Agriculture, in co-operation with the Ministry of

Health as far as may be necessary, to provide for the inclusion of herds already holding licences for the production of Certified and Grade A (Tuberculin Tested) milk. The formation of Accredited or Restricted areas may be left for future consideration.

It is also very desirable that organised efforts be made to show farmers that, in many instances, the eradication of tuberculosis from their herds is a *practicable proposition* and can often, if attempted along the right lines, be carried out without great expense.

Cost.—The question of cost naturally arises when the promotion of new measures is under consideration. We know that for some time to come it will be necessary in this country to do the best that can be done with what funds may be available and that these funds are not likely to be large. The estimate that tuberculosis causes an annual loss of more than £1,000,000 to the cattle industry of this country is probably an understatement, and in any case only a small fraction of this sum could be saved annually to begin with, but until a serious attempt is made to reduce the annual loss it will continue and is not likely to diminish.

Local authorities must bear their share, and it is worthy of mention that a number of county councils in England have already made appointments of the nature suggested, and in Scotland where according to repute money is not spent wastefully, most of the dairying counties have had full-time veterinary advisers for many years. It seems a reasonable inference, therefore, that such additional expenditure as might be incurred would be spent advantageously. The Government expenditure to meet compensation and other costs would not be large and the allocation of a modest sum would probably cover all requirements for a number of years. It is surely not unreasonable to hope that the development of a constructive and permanent policy for the reconstruction of British Agriculture should include a scheme to assist the formation of officially recognised tubercle-free herds.

The farmer must be prepared to incur some additional expenditure in order to separate reactors from non-reactors, to disinfect premises, &c., but the possession of a healthier herd will soon give an adequate return. There is a considerable amount of evidence and practical experience showing that a non-reacting herd is healthier in every respect than one which contains reactors. This is especially so in herds maintained entirely by home-bred stock. The market value of any breeding stock available for sale is increased. The loss from tuberculous wasters is eliminated and probably the loss from wasters due to other causes is much reduced. In this connection it may be

stated that since the herd of the University of Reading consisted solely of non-reactors (*i.e.*, since 1910) there has been no instance of a waster, with the exception of two animals affected by Johnes's disease, and in the herd of the National Institute for Research in Dairying there has been no waster of any kind since 1922. Further, experience in this and other countries shows that the life of the best milking cows is lengthened rather than shortened by the removal of sources of infection. Since 1910, the Reading University herd (a small herd) has had twenty-four 1,000-gallon cows which have had four to ten calves and have always passed the tests; in the Research Institute herd since 1923, there have been twenty-five 1,000-gallon cows which have had four to nine calves and these also have always passed the tests.

The final conclusion is that additional measures on the lines indicated would be to the great advantage of the cattle industry of Great Britain, and such measures should be introduced and carried out generally and effectively by joint action on the part of the State, the Local Authorities and the Farmers.

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Reading.

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THE MAKING OF PASTURE.

OWING to the continued depression in arable farming the past ten years have witnessed the laying down to grass of broad areas of English land, and have provided a unique opportunity of studying the problems of pasture-making. It may indeed be hoped that the future will see a revival of tillage, but it is fairly certain that temporary and permanent grass must always remain important features of English Agriculture. It has accordingly been thought that a useful purpose would be served by summarising and recording the experience that has recently been accumulated; and since many aspects of pasture-making are of a local kind, the plan followed in this article has been to place, side by side, the views of a number of authors, each of whom has special knowledge of a particular area.

Looking to the future, it would seem that the main hope of further progress lies in the use of indigenous strains of herbage plants in place of the commercial cultivated types and strains of foreign origin, which have so far provided the bulk of our seed supplies. Accordingly, the symposium concludes with a paper by Professor R. G. Stapledon on the value and use of these indigenous strains.

I.—THE NORTHERN COUNTIES.

DURING the last thirty years considerable experience has been obtained in the laying down of land to temporary and permanent pasture in the North of England. The need for replacing the

arable acreage by pasture became acute during post-war years, but even before this time two factors contributed to make the problem of obtaining an increase in profitable pasture an important one.

Firstly there was the difficulty of farming the strong boulder-clay soils successfully on a short rotation. This was occasioned by the frequent failure of the root crop—either by reason of inability to obtain a plant, or from finger-and-toe disease—and the failure of the cultivated clover plants in seeds mixtures.

Secondly, Northumberland carries a stock of nearly $1\frac{1}{2}$ million sheep, or nearly one-fourteenth the total sheep population of England and Wales, and consequently there is great need for good, clean pasturage. The class of sheep kept in the mixed-farming areas are those which are suited to an open range and consist chiefly of the Half-breds (Border Leicester-Cheviot). For some considerable time there has been a distinct tendency in Northumberland for arable land to be worked primarily in relation to the needs of live stock, particularly sheep, rather than for corn production.

The climatic conditions in Northumberland are not unfavourable to pasture. While the rainfall is not more than 26 inches per annum, it is evenly distributed, and the summers are comparatively cool, with the result that in normal years there is not a rapid evaporation of moisture from the soil. The severe droughts experienced in other parts of the country are much less frequent in the North of England.

The lowland areas comprise chiefly heavy soils lying on the boulder-clay and light free-working soils lying on the millstone grit and on glacial sands. On none of these soils did cultivated clovers give consistently good results in seeds mixtures, owing either to acidity or lack of phosphates or both. In some cases they failed to give a plant in the first year and they invariably died out before the second.

The work at Cockle Park, commenced in 1896 by the late Sir William Somerville, quickly demonstrated the value of phosphates as a means of improving permanent grassland through the encouragement of wild white clover. The effect of this work is now evident on thousands of acres of permanent pasture-land in Northumberland, much very inferior land being now transformed into excellent feeding pastures.

The late Professor D. A. Gilchrist took over the directorship of Cockle Park in 1902, and continued enthusiastically the work of pasture improvement commenced by his predecessors, Somerville and Middleton. In addition he developed with great success the work on seeds mixtures which he had commenced at Bangor and Reading. He included in his seeds mixture the wild white clover plant which had proved so useful on permanent pasture

land, and by suitable manuring with phosphates was able to establish leys which gave most satisfactory returns from the first year after seeding down.

Having succeeded in obtaining a ley which would give satisfactory results he extended the rotation on the strong, boulder-clay soil at Cockle Park from a four course to a six course, allowing the ley to remain for three years. In this way Gilchrist succeeded in doing what had been suggested by Culley at the end of the eighteenth century. The failure of the root crop on these strong soils had led Culley to suggest a rotation of three years arable crops and three years grass. Until Gilchrist's work at Cockle Park this had not been satisfactorily realised owing to the very poor returns from the seeds mixture in the second and third years, and the tendency for the land to become foul.

This lengthening of the rotation greatly increased the returns from such strong land. Besides yielding valuable hay and aftermath, the wild white clover ley during the three years collected much nitrogen, which became available for succeeding crops in the rotation. The ploughing in of an abundant root system helped the physical condition of the soil and facilitated tillage for the succeeding arable crops. In addition, roots and oats were taken less frequently on the same land, so that healthier and more vigorous crops of these were obtained.

Many poor clay soils in Northumberland which have been farmed in this way for two or more rotations now show marked improvement in the character and depth of the soil. Their fertility is thus greatly improved and in many cases more roots and grain are produced from the reduced acreage of plough land under a six-course or longer rotation than from the old four-course.

Most farmers have for some years endeavoured to carry a maximum sheep stock. The limiting factor to the head of sheep that can be carried on the lower lands is not the amount of food that can be produced, but the number of animals that can be kept in health. The effects of over-stocking with sheep are well known. It is found that new leys not only provide very suitable keep for sheep, but can be more heavily stocked without risk of disease; when the ley is broken up every few years for the arable crops of the rotation the land is rested from sheep.

COCKLE PARK SEEDS MIXTURE.

Gilchrist departed from the complex seeds mixtures which were usually sown for long and permanent leys. He made trials with different species in the nursery at Cockle Park and selected for field trials only such as stood well and persisted under local conditions. In the field he tested his simple mixtures alongside

the more popular complex types and ruthlessly eliminated any plants which did not do well in competition with others in Northumberland. The result was that his mixture became confined to three species of grasses, Perennial Ryegrass, Cocksfoot, and Timothy; while for clovers he depended on single-cut cowgrass, wild white clover, and to a lesser extent, on trefoil. The mixture he recommended for both temporary leys and permanent grass, and which has been used with so much success, not only in the North of England but in many other parts of the country, was—

16 lb.	Perennial ryegrass
10 „	Cocksfoot
4 „	Timothy
4 „	Single cut cowgrass clover
1 „	Trefoil
1½ „	Wild white clover.

For long leys and permanent pastures it is important that mixtures contain species that are likely to persist. The presence of a large number of temporary or short-lived plants is undesirable, as the place of these in the pasture is likely to be taken by inferior grasses or weeds. The great value of wild white clover is not merely that it persists, but that it spreads quickly and takes the place of any such temporary species.

Given satisfactory manuring and proper management the three grasses included in the seeds mixture above, with wild white clover, will persist in competition with each other under North of England conditions. This is illustrated at Cockle Park, where on poor clay soil a seeds mixture containing these plants, and receiving only 10 cwt. high-grade basic slag every three years, gave an average yield of 37½ cwt. per acre of excellent-quality hay for seventeen years, in addition to valuable aftermath for grazing purposes. At the end of that period 97 per cent. of the herbage consisted of a well-balanced mixture of wild white clover and the three grasses sown in the original mixture, while only 3 per cent. of other grasses and weeds were present in the turf.

BEHAVIOUR OF INDIVIDUAL SPECIES.

Perennial Ryegrass is valuable both as a hay and pasture plant, but requires good conditions of soil and a liberal supply of plant food. Where wild white clover is present in sufficient quantity to supply the necessary nitrogen, and the pasture is able to carry sufficient stock to allow for the necessary treading, perennial ryegrass persists quite well. Being winter green it provides useful keep for sheep in winter. It is very difficult to retain a satisfactory proportion of perennial ryegrass in a pasture without wild white clover.

Ayrshire seed is usually sown in the North of England. The

seed of indigenous ryegrass saved from old pastures has been used in some cases, and for pasture purposes has given quite good results. For hay the commercial types usually do better. It is found inadvisable to sow indigenous ryegrass seed along with the commercial types in a seeds mixture, as the latter become established more quickly, and tend to overshadow the more prostrate indigenous plants.

Cocksfoot has proved to be one of the most useful plants in the seeds mixture in the North of England, provided it receives proper management. It has the advantage of early and abundant growth and makes a quick recovery after grazing. One of its disadvantages is that, if it is not eaten in the early stages, it tends to become coarse; stock then refuse it, and a rough, tufted, unsightly pasture is the result. It is not winter-green and so does not provide a large amount of winter grazing. Pastures containing cocksfoot should not be allowed to become too coarse before grazing, otherwise it will dominate the herbage and check the ryegrass and wild white clover. On the other hand, if pastures containing cocksfoot are very heavily grazed during their early life the cocksfoot frequently fails to become established. Owing to its habit of growth, it will not stand the same hard, close grazing as plants like perennial ryegrass, and it does require an occasional rest period. Light seedings of cocksfoot have usually resulted in tuftiness owing to the fact that the plant begins to grow early before other plants in the pasture are ready for stocking, and the regulation of the grazing to keep the cocksfoot in check in the early stages is difficult.

Timothy persists well under North Country conditions, and while in dry seasons it does not produce a large bulk of keep, it is nevertheless useful and is seen in abundance in wet seasons. For this reason it is more popular on the west side than on the east. Seed from Scotland usually gives a more lasting plant than Canadian or American seed.

Single-cut Cowgrass is the cultivated clover which has stood best and given the greatest bulk when a hay crop is taken in the first year. In the aftermath it makes quite a useful grazing plant and is frequently found to stand satisfactorily into the second and the third years.

Seed from Suffolk has been found to give most satisfactory results over a number of years. In the hay crop it matures earlier than the Montgomery Red, and gives much useful aftermath. Cornish Marl has been tried at Cockle Park, but does not give such good results as either of those previously mentioned.

Trefoil is now only included in small quantities. It can be relied on to give a plant when other clovers fail. If much is sown it tends, owing to its early growth, to dominate the herbage, and particularly to suppress the wild white clover. It also

becomes too mature and gives stemmy, unpalatable hay. On some soils it seeds freely and tends to increase in the pasture at the expense of the wild white clover.

Wild White Clover is in many respects the most important plant in the mixture. It is a true perennial and, given satisfactory conditions, it quickly takes the place of the Single-cut Cowgrass and other plants which die out of the ley, thus preventing the entrance of weed plants into the pasture. The amount of seed to be sown depends on conditions. On soils where a good seed bed is obtained and it is known that wild white clover does well, satisfactory results have been obtained with a seeding of only one-half pound per acre. It is most important that a good sole of wild white clover should be obtained quickly, in order to ensure the permanence of the perennial ryegrass, and to keep out inferior species. For this reason a liberal seeding of $1\frac{1}{2}$ to 3 lb. per acre, according to conditions, is usually recommended if it is considered there is any risk of the failure of the plant.

OTHER SPECIES.

Italian Ryegrass is not as a rule included in seeds mixtures for long or permanent leys. Because of its earliness, and the top character of its growth, it tends to overshadow and depress the clovers in the first year. In special cases where it is important that the ley in the first year should provide early keep for ewes and lambs, 4 to 8 lb. Italian ryegrass is sometimes included in the seeds mixture. Provided the ley is carefully grazed early in the first year the objection to the Italian ryegrass is not so great.

Meadow Fescue, which in some parts of the country is a valuable feeding plant, is much too uncertain for the North of England. In many cases, even where considerable quantities have been sown, it is very difficult to find a plant after the second year.

Crested Dogtail is an unsatisfactory plant, particularly on the east side. While it has the advantage that it is winter-green, it fails to produce sufficient bulk of keep to justify its inclusion in the mixture, and has the added disadvantages that it sends out flowering stems which are invariably refused by stock. These produce seed and in consequence there is a tendency for this plant to increase and so reduce the productivity of the pasture. On the west side of the country, in parts of Cumberland and Westmorland where the rainfall is higher, and crested dogtail produces a greater bulk of keep, the objection to it is not so great, although it is very doubtful if under any conditions in the North of England the inclusion of dogtail in a mixture is justified.

Rough-stalked Meadow Grass has not given very satisfactory

returns where the custom is to take a hay crop, but for pasture conditions one or two pounds of rough-stalked meadow grass have been included in the mixture recommended with quite satisfactory results. The plant can be established fairly readily and appears to give a considerable amount of leafy pasturage.

Smooth-stalked Meadow Grass has not given such good results as the rough-stalked meadow grass.

Sweet Vernal, *Hard Fescue* and *Sheep's Fescue* do not give satisfactory results and as a rule fail to establish themselves from seeds sown.

Plantain or *Ribgrass*, *burnet*, *yarrow* and *chicory* have never justified inclusion in the seeds mixture, and it is found that their place is much better taken by wild white clover, which gives valuable keep, and in addition collects nitrogen and maintains the fertility of the soil.

English Broad Red Clover has not in the North of England given the same reliable results as the true single-cut cowgrass clover, particularly on the strong clay soils. The "take" is much less certain and the amount of herbage produced has usually been less. Over a considerable number of years it was found that mixtures containing single-cut cowgrass produced 4 cwt. more hay in the first year than those in which ordinary broad red clover was used.

Alsike Clover has not proved satisfactory except on good deep soils. On the poorer soils it fails to compete successfully with the red clovers and is scarcely found in the ley. When used alone a fair plant is often obtained, but it gives much less hay than the broad-leaved clover if this is taken the first year. Where the mixture is grazed in the first year on some soils, particularly on good moist loams, *Alsike* is found to persist fairly well and adds variety to the pasture. It is not, however, generally recommended.

Dutch White, or *Commercial White Clover*, is not recommended for inclusion in mixtures for long or permanent lays. It gives good grazing in the first and often again in the second year, but it competes with the more permanent wild white. Its use in the north of England is now largely confined to mixtures for one or two years' sheep grazing.

SEED-BED AND SOWING.

To obtain a satisfactory return from the time of laying down a pasture it is essential to have a good vigorous plant giving a well-covered sward from the outset. The seed-bed and the after-management both play a most important part in the establishment and ultimate character of the pasture. Success depends as much on these factors as upon the seeds mixture.

Quickly to establish a vigorous, high-yielding pasture requires

good conditions of soil and an absence of competition from weed plants. While there are numerous cases where most satisfactory pastures have been produced from seeds sown under poor conditions, and even on land infested with weeds, the risk is much greater and more time is invariably required before they yield satisfactory returns. The best and most uniform "takes" of seeds are usually obtained when the grass and clover seeds are sown with a cereal nurse crop. Barley is most favoured for this purpose as its growing season is short, and it does not shade the seeds so heavily as other cereal crops; further, the early removal of the barley crop allows the young seeds to make some growth and become well established before the bad weather of the autumn.

The grass and clover seeds are usually sown broadcast soon after the corn is drilled, as it is found that a much more uniform distribution of the plants is obtained by broadcasting than by the use of a coulter drill. It is most important that a good tilth should be secured. Both grass and clover seeds are small, and satisfactory plant establishment is only likely to be obtained with a fine, firm seed bed. A good take of clover is a first essential for the establishment of a good pasture and the use of the harrow and roller to give suitable soil conditions is therefore most important.

SOWING DOWN WITH RAPE.

Sometimes on very light soils there is difficulty in getting wild white clover established. In such cases it has often proved advantageous to depart from the usual practice of using a cereal as the nurse crop and to use rape for this purpose. Light soils are frequently weedy and when rape is used sowing can be delayed until some cleaning has been done. Another important advantage is that the grazing of the rape can commence during the summer, and the treading and consolidation of the soil by this means is a great advantage in the early establishment of the clover.

On poor grassland where there is a dense, matted turf it is often found desirable to resort to ploughing and reseedling as a means of improvement. Where possible it is an advantage to put such land through a rotation before reseedling, since this has the effect of getting rid of the accumulation of inferior plants and of enriching the soil. Where the land is immediately sown down with a seeds mixture under a first corn crop there is always considerable risk of failure. There is difficulty in obtaining a firm seed-bed for clover on the newly turned in sward, and there is a danger of the reappearance of many of the inferior species of plants which were present in the old turf. If for any reason it is considered necessary or desirable to reseed immediately

after breaking up, it will often be found advantageous to seed down with rape, in order to obtain the benefit of the treading by stock during the eating off of the rape.

MANURING.

Suitable manuring is a most important factor in the establishment of the sward. The satisfactory development of the sown species is largely dependent on encouragement afforded by suitable manuring. On the boulder-clays of Northumberland, bent-grass and crested dogstail very quickly make their appearance if the better types of plants are not able to compete satisfactorily. On the lighter soils Yorkshire Fog soon makes its appearance. Once these plants become established in a pasture they are most difficult to eradicate.

If the wild white clover can be kept vigorous by suitable soil conditions and manuring, it quickly spreads and holds the ground against the inroads of such weeds. This plant and perennial ryegrass have particular value in that they give a good sole to the sward and keep out, or suppress, undesirable plants.

The chief aim of manuring should be to ensure a good clover plant, and for this purpose phosphatic manures are most important. The kind of phosphatic manure varies very much with the soil conditions. With moisture and acidity, North African Phosphate has been found to give very satisfactory results. Where the soil is not so acid, highly citric-soluble slag usually gives more satisfactory results than North African Phosphates. Acidity for young seeds is always a disadvantage because the wild white clover and the better grasses do not become established so readily under such soil conditions. In many cases the application of lime to such soils has given most satisfactory results. On the strong clay soils of the North of England potash manures have not been so necessary for pasture land, but on the lighter soils it frequently happens that there is a marked deficiency in potash, especially where farmyard manure has not been liberally applied. In such cases some potash fertiliser is desirable.

The roots of the wild white clover, once established, provide sufficient nitrogen for the needs of the grasses. It is found better to allow the grasses to be dependent on the clover root for their nitrogen rather than to make direct applications; when the latter is done the grasses are less dependent on the clovers, and may compete so successfully as to reduce seriously the proportion of clover in the pasture. In cases where there is special need for an early bite in spring, nitrogenous manures are sometimes used with success. In the North of England, however, the chief limiting factor to growth in spring does not

appear to be lack of nitrogen, but weather conditions. Even in cases where an early growth has been secured it is doubtful if it can be fully utilised in all seasons, for it has a strong laxative effect on the grazing stock, which is especially harmful during spells of cold weather.

From results obtained it would appear that nitrogenous manures should be used only for special purposes. The main needs of the pasture, so far as manures are concerned, should be met by phosphates and potash.

For land in comparatively good heart nitrogenous manures are not to be recommended. When applied at the time of seeding they tend to produce increased straw with the nurse crop which may then become laid and so kill out the young seeds, or overshadow the young plants. Nitrogen further tends to encourage the grasses, so that they are able to compete unduly with the young clover plants.

On strong clay soils, a dressing of 5 to 8 cwt. of high grade basic slag applied every three years has usually proved sufficient to maintain first-class pastures. Although it frequently happens that no apparent return is obtained for the addition of potash, there are cases where these manures show good returns even on clay soils. For stiff clay soils sulphate of potash appears to give better results than the muriate or other forms. On the lighter soils profitable returns are usually obtained from the use of potash in addition to phosphates, the rate of application being 5 cwt. of basic slag and 2 cwt. Kainit or potash salts every three years. When hay is being taken from the land it is usual to double the dressings of phosphates and potash.

Farmyard manure gives variable results. On very poor soils, particularly those that are sandy in character, it is frequently found that a liberal dressing of farmyard manure, applied before the seeds are sown, assists greatly in obtaining a good "take." In cases where after one or two years the sward has become very thin or dry, dung has proved useful in helping the recovery. On the stronger soils, however, and once a good take has been obtained, farmyard manure has frequently given results much inferior to those obtained from phosphates; this is true both for hay and pasture.

At Cockle Park on boulder clay soil, 10 cwt. of high-grade basic slag applied every third year gives an average yield of 32½ cwt. of hay, while 10 tons of dung in addition to 10 cwt. of high grade basic slag has given, on an adjoining plot, only 29½ cwt. of hay. The effect of the dung was to produce a much more uneven sward, characterised by more top growth but lacking in the uniformity and thickness of the slag alone plot.

The great necessity for suitable phosphatic manuring for the

development of a good wild white clover ley is shown by the following results from plots sown at Cockle Park in 1906. For eleven years thereafter the average crops of hay per acre were as follows :—

No basic slag, no wild white clover, 5½ cwt.

No basic slag, but with wild white clover, 9½ cwt.

Basic slag and no wild white clover, 23¼ cwt.

Basic slag and wild white clover, 34 cwt.

EARLY MANAGEMENT.

The early management of the pasture is important. The ultimate composition and character of the sward depend to a very large extent on the treatment received in the early years. Provided a satisfactory plant of seeds has been obtained it is usually best to take a hay crop in the first year. It is, however, important that this should be cut early, for if it is allowed to become too mature the plants, especially perennial ryegrass and the cultivated clovers, are considerably reduced in vitality. The aftermath is best grazed ; if allowed to grow for a second cut of hay the grasses and the wild white clover are overshadowed by the single-cut cow grass and do not become well established in the autumn before bad weather sets in.

If the pasture is to be grazed in the second and succeeding years, special care is needed so to control the grazing that there is an opportunity for both clovers and grasses to become established. Wild white clover benefits from heavy grazing. Cocksfoot, which does not become well established in the North of England in the first year, will not tolerate the same degree of close grazing as wild white clover and perennial ryegrass. If grazing be very close in the early years it frequently happens that little cocksfoot remains in the sward. Many farmers consider that cocksfoot is a most important constituent in the pasture because when this is present in suitable quantity a good mixture of grass and clover is provided. Without cocksfoot there is frequently a tendency for wild white clover to dominate the perennial ryegrass, with the result that the bulk of the pasturage consists of clover. Stock do not thrive so well on pastures where clovers provide the bulk of the herbage, as in the moist climate in the North of England the high protein content and the succulent character of the clover tend to produce scouring. Cocksfoot is also valuable when it is desired to take a hay crop. Provided it is cut early it gives a large amount of hay of good feeding value. It has already been said that cocksfoot will not tolerate severe grazing, and in some cases, where there are signs of falling off in the amount and vigour of the cocksfoot after pasturing for a year or two, it has been found

advisable to take a hay crop. This rest period enables the cocksfoot to become re-established.

While careful control of grazing is important for all pasture land, there is need for special consideration in the case of land newly laid down to grass. Too light grazing tends to give patchiness, allows seeding and may check the development of the wild white clover. If wild white clover is not developed in quantity it is usually found that the perennial ryegrass dies out at the end of three or four years.

The class of grazing animal used has a very distinct effect on the pasture produced. Horses are bad graziers and should not be allowed on young leys; they are curiously selective, and bite too closely on those areas where they do graze; by neglecting the areas where their dung is deposited they allow these to become coarse.

Sheep alone are unsuitable grazing stock for much of the better pasture land. They have greater selective powers in grazing than cattle and choose the finer bottom or leafy herbage, refusing the stronger growing portions of the herbage and the flowering stems.

At Cockle Park it was found that, when sheep alone were used for grazing improved pasture, only one-half the live weight increase per acre was produced as compared with that obtained from a mixed stock of cattle and sheep. In the early life of a pasture it is particularly important that some cattle should be run with the sheep stock; with sheep alone it is very difficult to prevent a large number of the plants sending up flowering stems, unless by grazing so heavily as to check seriously the cocksfoot and timothy. Cattle are the best grazing animals because they have not the same selective power, and graze much more evenly. In the North of England there has been a great improvement in pasture management during recent years, and the harmful effects of unbalanced stocking with sheep are not seen to anything like the same extent as formerly. Considerable numbers of cattle are fattened on pasture in the North of England, but on the best lands great care is taken to clean up the roughage by means of store cattle after the fattening cattle have been finished.

Young leys should not be used for wintering stock, especially cattle. Apart from the fact that cattle do not thrive well because they lie cold and wet, they plunge the ground. Young pastures are characteristically more open and free from turf than old ones, so that heavy treading produces much more harmful results.

When a good plant has been obtained from the time of first seeding down there is not the same likelihood of large numbers of weeds being present in the pasture. Despite good management, however, docks and the common thistle frequently give trouble

on newly formed pastures, and tend to spread more rapidly than on old pastures. By taking a hay crop in the first year thistles and similar weeds are checked and subsequent control is made easier. Systematic early cutting of thistles and removal of docks in the early years is very helpful in securing a clean sward. The importance of adequate fencing in order to facilitate the control of grazing cannot be over-emphasised. Recent grassland competitions show the impossibility of efficient control of the grazing where for any reason a large area has to be grazed as a single unit. Control of grazing is by no means the least important factor in securing the fullest returns from land laid away to grass.

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II.—NORTH WALES.

WALES, with its mild climate and high rainfall, has from early times been a pastoral country. Grass is easily established and it grows luxuriantly, for little of the country lies more than fifty miles inland from the western seaboard. On the larger lowland farms, mixed farming was until recently practised, and the sale of oats contributed largely to the annual income. Apart from the normal arable break in the rotation, it was not unusual for additional fields to be put to oats for two years in succession and to be seeded back to grass without roots. Of late years, very little ploughing is done on these farms. There is consequently but little winter fattening of cattle, and though a considerable amount of summer fattening is practised, many of these farms are largely devoted to dairying, whilst others have gone over to the production of fat lambs. The high price of spring stores, and the fact that the autumn markets are often glutted with unfinished butcher's beasts (in so much that but little of the land can fatten a beast over summer unaided), is already causing the more enlightened farmers to turn their thoughts towards a wider policy. This tendency is heightened, too, by the difficulty found in maintaining the productivity of grassland when a heavy stock of sheep has to be carried. Heavy grazing by sheep, especially over winter and into the late spring months, makes it supremely difficult to check the development of bent grass on the lighter lands, usually deficient in lime and liable at best to develop a mat from the fourth to the seventh year from seeding. The continued production of early fat lambs, with the increased drain upon the mineral resources of the pastures that such a practice implies, is in some cases becoming alarmingly obvious.

The heavy dressings of lime and phosphate, especially bone compounds, given in the past to such land may have been adequate to meet most mineral requirements in the past. It is to be feared, however, that departure from these practices may lead to depletion of mineral elements when the reserves of these carried over from the old regime become exhausted.

When it is realised (as we shall later attempt to show more fully) that but little of our sown pastures can be expected ultimately to develop into good quality permanent grass, and then only after passing through a long period of low productivity in the meantime, it is clear that maximum production in North Wales is best attained by recourse to more frequent breaking up of grass and re-establishment. This may best be accomplished by restoring the land through a short rotation of arable crops, or by the ploughing of the land in its fourth or fifth year when its productivity is declining and immediately re-seeding it.

On the smaller hill farm also, though the proportion of land under the plough at any one time is small, the effect of the plough on the general economy of the farm is great. And though deterioration in pastures is fairly rapid, it is easy to break up and to lay down long leys. Temporary leys have been greatly improved during late years, especially with the wider use of Wild White Clover, and deterioration does not set in as early in the life of the ley, or as severely, as it used to.

In the western districts there is not the sharp differentiation between arable and grass land which exists in most parts of England. The farmer ploughs most of his fields in turn, and with the higher productivity of young pastures over old he realises that the function of the plough is quite as much to maintain production from medium ley grassland as to secure the growth of arable crops.

SEEDING AND ESTABLISHMENT.

There is but a chance occasion in Wales for the use of a ley for a period of eighteen months or less; there is, besides, but little land down for two harvest years. Generally, the farmer expects of the seeds mixture that it yield pasture or hay for a period varying from four years to an indefinite period. Under our conditions the prospective length of ley really matters little above the shorter limit of three or four years, for, from the point of view of what species to include in the initial mixture the problem is identical whether it be contemplated for four or for forty years. Inter-specific competition, and the acid test of heavy grazing by sheep at critical seasons in the early years, will have reduced the sown species to a mere handful of those that can persist even by the fourth year, and the continued

occupation of the ground by these in the future will depend on the proportion in which they figured in the original mixture, and on judicious management.

Time of Sowing.

From work done at the Welsh Plant Breeding Station at Aberystwyth, it appears that seeds sown in the open will give a considerable degree of establishment between wide limits of sowing dates—from March to October. The only useful species that show any appreciable degree of establishment from September to October sowings are, however, Tall Oat Grass, which is of no wide use in Wales, and the Ryegrasses, especially Italian Ryegrass. Besides, autumn sowing gives but low primary establishment. It promotes considerable latency in other seeds which remain dormant until the return of more favourable conditions.

From the point of view of establishment, most grasses can give a satisfactory strike from August sowings. The clovers, however, fall off even with early August sowings. Rarely can it be claimed that the clovers have rooted deeply enough from an August seeding to withstand the night frosts of November and to be represented against the grasses in the same ratio after establishment as they did in the seed sown. Even amongst the grasses excessive selection goes on, and species like Meadow Fescue, Timothy, Meadow Foxtail and the small grasses generally have not had a good enough start to withstand the rigours of winter frost and wet. Sowing in August is too late to provide maximum hay yield in the first harvest year even from the most favoured and quickest established gramineous elements.

We can narrow the sowing period still further, for at Aberystwyth they experienced a fall in yield from early June sowings, and of the species sown in July Tall Oat Grass and Ryegrass alone gave level production from July sowings. In districts of high rainfall it is generally admitted that spring sowings are best, from late March to early May. Much depends on the season, but no chance should be lost after the end of March. Practice varies from district to district. In the Vale of Clwyd, oats are got in towards the end of March and the grass seeds follow in a day or two; whilst in Anglesey it is customary to delay the sowing of oats until after the planting of potatoes. On the upland farms, when a fraction of a field alone constitutes the arable break, the difficulty of clearing sheep from the low ground before early May often delays sowing operations unduly long, though in these districts, as elsewhere, the general tendency during the past generation has been towards earlier spring operations generally.

Methods of Sowing and Nurse Crops.

Grass and clover seeds are generally sown under a cereal nurse crop, usually oats. This cereal yields better than any other and is of high feeding value for stock. In the past barley occupied this position, and it proved then the favourite nurse. Of late years, however, little barley has been grown; the local malt kiln and brewery have ceased to function and the discontinuance of the practice of applying caustic lime at the time of seeding down (a practice that favoured barley), has rendered the barley crop precarious and unprofitable. On the uplands of Denbighshire and Merionethshire four-rowed barley (Haidd Garw) of the bere type is still favoured as a nurse for grass seeds. It can be sown later and cut a week earlier than ordinary barley, both factors commending it for such a situation.

The farming community generally discriminates but little as to choice of oat varieties for sowing down with. Victory is regarded as fairly good, though liable to get laid at harvest, especially if land be in good heart. Marvellous and Record would appear to be amongst the best varieties for this purpose.

Neither is due regard paid to the rate of seeding. In the interest of the grass and clover crop, destined to occupy the ground for some years, the seeding should be lightened materially. The change over from the long-breasted lea plough to the digger plough, and the abandonment of the broad-casting method of sowing cereals for the seed drill, has not yet effected the economy of seed-rates that such changes warrant. The variation that exists in the size of pickle in different varieties of cereals usually sown is also not duly appreciated.

Grass seeds are generally sown with a hand seed barrow a day or two after the corn and at right angles to the cereal drill marks. It is customary to give the land a light harrowing after the corn and to tine harrow after sowing before finally rolling, though the latter operation of itself is sometimes judged to be all that is required. Though the presence of much grass and clover growth in the corn at harvest is a menace in upland districts with poor weather and a late harvest, there is but little sowing of grass when the corn is up and braided, for it proves too risky.

From work done at the Welsh Plant Breeding Station at Aberystwyth it has been shown that maximum establishment is attained from sowing without a cereal. Though seeds under cereals tend to be hampered by the nurse crop, yet the cereal may prove less aggressive than the ryegrass elements of the seeds mixture itself if these be allowed to grow unhampered during the seeding year and the autumn grazing be not regulated.

If a cereal nurse be used, then it is better that the cereal be cut at the milk ripe stage, removing it after its nursing duties have expired.

Cruciferous plants, such as rape, mustard and turnips, or a mixture of these, prove better still as nurse crops because they can be grazed intermittently from the early establishment period.

Rape has found considerable favour in Wales as a nurse crop for grass seeds, especially on upland farms where the effective cleaning of the land cannot be accomplished early enough for cereal sowing in spring, and where outlying portions are frequently laid down without being put through a full rotation. Summer rape has for long been the favourite means of finishing backward sheep on the lowland in autumn, whilst rape sown after the beginning of August has been similarly favoured for use in February and March. Of late years the practice of seeding down with rape is spreading here also, especially where the land is ploughed up from poor grass and immediately re-sown. For such conditions rape is especially useful, for with the high spring rainfall the best of the spring grazing is available before ploughing up the ley, and rape does best when sown towards June. It is well to note, however, that for such conditions a seeding of 4 to 6 lb. of rape per acre is ample, low though it appears when compared with a seeding of 14 to 15 lb. when rape alone is sown.

When sowing under rape, a well-regulated scheme of intermittent grazing should be practised from about the 10th week after sowing. Sheep are ideal for this, and the practice reduces competition amongst the sown species in the seeding year and consolidation follows the treading.

Establishment.

The established sward should be consolidated as soon as possible. Clovers benefit particularly from consolidation, as is seen by their abundance on headlands and near gateways where maximum treading is found. If rolling is difficult after sowing, sheep can be brought on as early as possible. The maiden seeds should be rolled in spring of the first harvest year. The period between autumn of the seeding year and late spring of the first harvest year is one of paramount importance in relation to successful establishment. There is no doubt that for long-term leys and for permanent pasture, careful intermittent grazing alone should be practised during this period; if possible this should also be the treatment to be aimed at throughout the first summer of the maiden seeds. Even if the sward has to provide a crop of hay that summer, it is best that intermittent grazing be practised into late spring and the

field be put up for hay late and cut early. Luxuriant autumn growth left ungrazed until late in the seeding year, and the taking of late and heavy hay crops in the first harvest year, are practices to be deplored in that they prove harmful to the establishment of the slow-growing species. In North Wales, however, the fact that maiden seeds are grazed to the bone in the first winter, since usually the active native sheep has the run of the low ground from early November till April, works havoc upon the ley.

Manuring.

There has been considerable change in the practice of manuring both during the rotation and for young leys in North Wales in the last twenty years. It used to be the practice to give very heavy dressings of yard manure for roots, and the land would subsequently receive no manure until the second year in grass, i.e., between the first and the second crops of hay.

The root crops often showed excessive signs of disease, and the cereal nurse crop was encouraged to produce excessive growth that often got laid to the detriment of the seeds. Gradually there has come a change towards giving the root crop but little farmyard manure and to supplement with artificial manures. The manure thus saved is given to the young grass during the winter of the seeding year in preparation for the first crop of hay. Where hay is taken off the young leys for the first two seasons, as is commonly the case in Wales, this undoubtedly favours the establishment of the grasses. In some districts it is customary to apply yard manure both in the autumn of the seeding year and again after the first crop of hay has been removed, this second application to be followed with a good dressing of basic slag in the autumn of the first harvest year. This, it is contended, is the safest course to ensure a sound growth of wild white clover. Whether the benefit derived from autumn dunging in the early years of the ley be entirely due to its fertilizing effect, or, in part to the shelter it gives the young seedlings and to its deterrent effect upon excessively close grazing by sheep, it is not easy to determine.

The application of February and September doses of nitrogen to leys in their later years to provide respectively early and late bites, is a practice that is becoming increasingly popular. In our country, where scarcity of grass between May and September is not generally a serious menace, this seems to be a commendable way of utilising nitrogenous manures. Our climate allows of the extension of the growing season thus at either end, and the growth thus fostered is indeed welcome where such a heavy stock of sheep is carried over winter. The sowing of a catch crop of Italian Ryegrass with corn after grass to give winter

grazing in the stubble, also serves to reduce the scarcity of winter keep, and incidentally it should serve to ease the strain otherwise imposed on young leys during establishment.

While discussing the question of eking out winter keep in the open it is worthy of mention that much can be done towards providing for this if proper regard be paid when the mixture is compounded to the seasonality of growth in the various species. Italian Ryegrass is outstanding in greenness between November and May; Perennial Ryegrass, Rough-Stalked Meadow Grass and Crested Dogtail are also alike green over our mild open winter. Cocksfoot and Foxtail start growth early in spring, and though the winter growth of clovers as a class is almost negligible, Red Clovers are of value in autumn for they fill the gap that comes with the decline of the grasses from their zenith, *i.e.*, between July and September, the extra late red clover (Montgomery and Cornish Marl) being especially valuable at this period and during periodic droughts.

From the third year onwards it is customary to give the leys a dressing of some 6 to 8 cwt. of basic slag every third year. With the spread of the practice of ploughing up old leys and immediately re-seeding, the proved value of heavy dressings of basic slag in seedling establishment should be emphasised.

COMPETITION AND PERSISTENCY.

Competition amongst the several species included in mixtures is very severe. The directing of such competition, as far as it is in the power of the agriculturist to control it, can be more intelligently undertaken if the manner of the aggression be known beforehand. Some species, like the ryegrasses, are aggressive because they get away well in the seedling year; Italian Ryegrass is doubly favoured because it quickens especially early in the season. Species like Rough-Stalked Meadow Grass, Wild White Clover, *Agrostis* and Meadow Foxtail are aggressive in later harvest years because they are endowed with special means of vegetative reproduction, whilst others such as Sweet Vernal, Yorkshire Fog, and Crested Dogtail, depend for their success upon the ease with which they reproduce and re-establish themselves from seed, especially where inadequate grazing and neglect of mowing allow them. Others, such as Perennial Ryegrass, are biologically adapted to withstand heavy grazing and persistent treading. Likewise amongst the clovers Broad Red, by its earliness, depresses all other clovers, as the red clovers generally do in turn depress Alsike and White Clover in the early years of a ley when they co-exist in the sward. It is a realisation of this fact, and the difficulty of adequately controlling it, that has forced us to adopt an initial seeding of only those elements that will eventually persist in the sward,

to concentrate on an adequate seeding of this handful of permanent elements, even at the expense of foregoing the temporary high yields given, in the first harvest year, by fugitive species destined to pass out at an early date. In the eastern countries this has led to the abandonment of all red clover species from many seeds mixtures destined for permanent pasture, and the adoption of ultra simple mixtures of but three or four species such as Cocksfoot, Rough-Stalked Meadow Grass, Perennial Ryegrass and Wild White Clover.

Under the conditions that prevail in Western Wales, some five species alone of the multiplicity that have from time to time been tested, persist into the fifth year and beyond. They are Perennial Ryegrass, Rough-Stalked Meadow Grass, Crested Dogstail, Cocksfoot and Wild White Clover, and the farmer must needs depend in the main on these for successful establishment. Under the best conditions the sward tends to deteriorate; Yorkshire Fog and Bent Grass come in quickly on the lighter soils and with inadequate cleaning.

Heavy sowings of Rough-Stalked Meadow Grass (2-6 lb.), Wild White Clover (1-2 lb.) and Crested Dogstail (2-6 lb.), arrest deterioration and fill up the bottom quickly. Heavy seedings of Rough-Stalked Meadow Grass pay well in regions of high rainfall, and Crested Dogstail is an effective check on Bent Grass on the lighter lands where this weed proves such a ready menace. Perennial Ryegrass thrives well alongside of Wild White Clover, the latter supplying the high nitrogen content that this grass seems to need. Cocksfoot, because of its earliness, both in spring and in aftermath, is largely favoured by the sheep grazier, though it is viewed with disfavour by the cattle grazier and fattener. Light seeding of this grass favours tufted growth. With a seeding of 6 lb. and upwards this undesirable feature is not so noticeable, but this grass needs careful management or else it grows rank and aggressive. Meadow Fescue stands competition badly, and succumbs easily to the Ryegrasses which in our climate are far superior to it. Timothy fails to stand the heavy grazing of sheep, though in swards annually mown it persists well, and could be sown in much larger quantities than are usually the practice where conditions of cropping and management favour it.

Broad Red Clover is too short lived to be included in any quantity in long leys. Its liability to depress White Clover in the early stages is too serious a feature to warrant its inclusion. Montgomery Red Clover, Swedish Late Clover and maybe Wild Red Clover are very useful in late districts at high elevations and of low fertility. The first mentioned, along with Timothy, does particularly well on the uplands where the hay season is late. On upland peat in Merionethshire surprisingly successful

establishment has been attained from a seeding of Timothy, Alsike, Rough-Stalked Meadow Grass and Wild White Clover.

The deterioration that so readily threatens can be better arrested by grazing than by putting to hay, the good effect of treading in getting ungerminated seeds and weak seedlings to the light being a feature of the grazing method. It is, however, difficult to cater for the demand usually prevalent in Wales, *viz.*, for a mixture to be mown for two or three years that will give a resultant sward for grazing for subsequent years. Single-purpose mixtures for hay or for grazing are easy enough to compound and the suggestion that grazing and haying be met in the same season from the same sward, by putting up for hay when the best of the spring growth has been removed by grazing stock, seems to be too revolutionary for immediate general adoption.

Species and Strain.

The need for extending the growing season forward into spring and onward into autumn, so as to reduce the discrepancy between peak production in early summer and the rest of the year, has already been touched upon. This need is becoming obviously felt in our area of late years, for with the decline in arable sheep farming, especially in the south and the west of England, and a consequent increase in the grass flocks of those districts, the market in late summer tends to be glutted with lambs and fat ewes. Owing to the decline of winter fattening of cattle in our own area there is similarly a glut of half-fat beef in autumn and high prices ruling for stores in spring. Much can be done to meet these conditions by the extended use of indigenous species of grasses and other herbage plants. They have proved far superior to alien commercial forms for persistency, for leafage, and for the length of season over which they provide effective keep.

At Aberystwyth, in comprehensive tests on the aggregate of pasture yields for four harvest years, indigenous strains have surpassed other strains by 16 per cent., and in leaf yield by as much as 26 per cent., whilst all indigenous strains have out-yielded others in the later harvest years. Commercial hay-producing elements have a much higher proportion of stem to leaf, a less dense bottom growth and a bigger top layer of flowering stems that are avoided by stock. In the writer's own experience, under conditions of consistently hard grazing over long years, the representation of indigenous forms of perennial ryegrass and cocksfoot were respectively twice and five times what the figures stood at for the parallel commercial strains. When we shall have discriminated between nationality and strain of pasture plants with the same success as has been

achieved by cattle breeders within their breeds and herds for many generations, and when we have an adequate supply of these superior forms, we shall be able to pass directly from the excellent short leys of to-day to prime old leys of the old permanent pasture type without the lean and unprofitable intermediate period hitherto so discouragingly unprofitable.

SUITABLE MIXTURES.

Having regard to the purpose for which a ley is primarily intended, the following mixtures are quoted (with Professor R. G. Stapledon's kind permission) from Bulletin Series H, No. 8, Seasons 1921-28, from the Welsh Plant Breeding Station at Aberystwyth. They are necessarily applicable to districts of high rainfall and are based on results actually obtained in Wales. Lack of space forbids us to discuss any details of modification and adjustments. For a comprehensive discussion of the question the reader is referred to the above-mentioned publication.

(1) *Grazing only Mixture*, to be grazed from 8 to 12 weeks after sowing, in its simplest form.

	Lb. per acre.
Italian Ryegrass	8
Genuine <i>Ex</i> Old Pasture Perennial Ryegrass	14
Rough-stalked Meadow Grass	4-6
Genuine Wild White Clover	2-3

(2) *Grazing—Hay Mixture*, *i.e.*, for grazing and for hay in the same year. When the sward is grazed till late April or early May and then put up for a light crop of hay, after which autumn and winter grazing will be intermittent.

	Lb. per acre.
Italian Ryegrass	6
Perennial Ryegrass :	
Irish, Ayrshire or New Zealand	4
Svalöf Victoria	4
<i>Ex</i> Old Pasture	7
Cocksfoot :	
Danish	3
New Zealand and (or) Indigenous	7
Timothy :	
American or Ayrshire	2
Svalöf Gloria	3
and Indigenous	3
Rough-stalked Meadow Grass—Danish	2
Crested Dogtail—Irish or New Zealand	2
Broad Red Clover—English or New Zealand	2
Late-flowering Red Clover :	
Montgomery or Cornish Marl	3
English Late (<i>ex</i> -Essex)	2
White Clover :	
European	1
New Zealand	1
Wild White	1

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Rough-stalked Meadow Grass—Danish	2
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Broad Red Clover—English or New Zealand	2
Late-flowering Red Clover :	
Montgomery or Cornish Marl	3
English Late (<i>ex</i> -Essex)	2
White Clover :	
European	1
New Zealand	1
Wild White	1

The seeding has to be heavy and the dual service asked of the mixture is attained more by a blending of strains than by an indiscriminate blending of species.

(3) *Hay—then Pasture Mixture.* As the most usual demand is, however, for a mixture to provide hay for two or more seasons and then pasture for an indefinite period, the following is quoted as a modification of the Cockle Park Mixture that has given good results over a wide range of conditions in Wales.

	lb. per acre.
Italian Ryegrass	6
Perennial Ryegrass	14
Cocksfoot	8
Timothy	5
Rough-stalked Meadow Grass and (or) Crested Dogtail	3
Late-flowering Red Clover	6
Wild White Clover	1-2

Apart from modifications of the above mixtures for various conditions and situations, to meet which the reader is referred elsewhere above, it is finally worthy of note that only those species known to persist should be included. Perennial Ryegrass, Rough-stalked Meadow Grass and Wild White Clover once established will stand a deal of mismanagement. The other species mentioned will variously need to be checked or fostered to retain them in the desired proportion, and in the interest of the sward vigilance in management must at no time be relaxed.

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III.—THE BETTER MIDLAND AREAS.

SINCE the end of the war there have been many opportunities and ample time to test the results of attempts at seeding down land to permanent pasture. In the Midland counties of Nottingham, Derby, Warwick, Stafford, Rutland, Northants and Leicester, no less than 258,734 acres have been laid down in grass (or at any rate have ceased to be arable) during the last ten years. Such figures demonstrate very forcibly the great changes which have been made in a very short period of farming. It may be stated that nearly all the land broken up during the food production campaign has been returned to grass, and a further considerable acreage in addition. The type of land which has been transferred to permanent pasture is that which gives rise to the heavier kinds of soil, which are difficult and expensive to

cultivate and more especially where cereals have constituted the chief crops. Owing to the low prices prevailing in recent years such crops have usually been grown at a loss, or with so small a margin of profit as to render the undertaking scarcely worth while; the easiest way, and for the moment the cheapest, was to let such land tumble down to grass, and this method has been adopted in quite a number of cases.

The popularity of this tumble-down method was due to the fact that in practically all districts attention was drawn to fields that had been broken up under order, and put through a more or less indifferent course of tillage—in some cases two or three white straw crops succeeding each other. After the final harvest the gate was closed and the field allowed to take its chance. Some of the fields treated in this manner seemed, for the time being, to make extraordinary recovery. Many cases came under the writer's notice in which neither seed nor fertilisers had been applied after the last straw crop and which, in the space of 12 to 18 months, presented a uniform sheet of vigorously growing wild white clover. In one or two instances trefoil was prominent, but in most cases it was noted that the ordinary grasses—ryegrass, cocksfoot, timothy, dogstail, and rough-stalked meadow grass—were practically absent. Subsequent observation has shown that such pastures have not made much progress; they have in fact demonstrated that the "tumble-down" method can only be described as very unsatisfactory. Unfortunately, in these cases valuable time has been lost and a poor struggling unproductive pasture is the result. A golden opportunity has been missed, because it can now be amply proved that where suitable methods were adopted, fields where the herbage was previously poor or moderate, are now in grass of a much better quality than they carried before the breaking-up campaign began. At the outbreak of war there were thousands of acres of grassland which had been indifferently treated for long periods, during which unsatisfactory surface conditions had developed. The only real and practical remedy was to plough them up and, when difficult times came, to re-sow. In tillage, a great number of these fields produced excellent crops and their reserves of accumulated fertility came in very useful at a very difficult and trying period of the nation's history.

Much of the land ploughed up during the war had been arable until the severe depression of the nineties. At that time farms were difficult to let, landlords had much land on their hands and thousands of acres were allowed to tumble down. On suitable soils, and with generous treatment later on, much of this land produced fairly good pasture, although it took nearly 30 years to do it. The valuable properties of

wild white clover were at that time barely recognised, hence the long period of time required for the building up of satisfactory grazing land. Such land made very slow progress until the value of basic cinder and later basic slag was recognised. Research and practical demonstrations showed the way towards new methods of treatment and new mixtures of seeds, whereby the productivity of our grassland vastly increased. Generally speaking, it was not the very best grazing land in the Midland area that was ploughed up during the food production effort. It is true that some excellent grazing fields were ploughed, but they were not numerous. There was a feeling at the time that the very best fields should be spared. Much of the land ploughed out carried only three or four crops before returning to grass and official figures show that the rate of seeding down was very heavy between 1920 and the end of 1925, averaging in the case of Leicestershire about 6,000 acres per year.

The type of soil chiefly determined which fields were to be sown down, heavy sticky loams and clays being the first to go. Such soils are of just the type required to make good pasture; they are retentive of moisture and they usually contain fair proportions of phosphates, potash and lime—though there are, no doubt, many instances where one or other of these substances is deficient.

Armstrong reported many years ago that many of the soils examined in this area contained high percentages of available phosphates and potash. On comparing the analyses of the soils with the chemical composition of the herbage there appeared to be some relation between the high quantity of available phosphate in the former and a high percentage of nitrogen and phosphate in the latter. Fields were also examined where the phosphate and nitrogen were too low, and here the analyses of the herbage reflected the poverty of the soil. In some instances also the bad mechanical condition of the soil resulted in poor quality herbage.

After examining a very large number of fields in the area, the writer came to the conclusion that the mixtures of seeds likely to be most useful were those of a comparatively simple character. The average rainfall of the Midland area is by no means high, ranging from 25 to 30 inches per annum, and the general topography is that of a gently undulating country which rarely exceeds 600 feet above sea-level. The soils of the best grazing areas are varied. The eastern half of Leicestershire and parts of Northants and Warwick lie chiefly upon the Lower Lias clay, and soils from this formation are to be found in the valleys, as in the vale of Belvoir, where perhaps the Lias clay pastures are to be seen at their best. The outcrops of the

Middle and Upper Lias generally appear over the whole of the Lias area upon the gently rising slopes and summits of the rounded hills, and especially on the more elevated parts. Varying expanses of boulder clay are met with and occasional patches of glacial sands and gravels are to be found; these last give rise to soils of a sandy and gravelly character usually carrying a herbage of only moderate quality but making generally good store land. The herbage on the best of this type of land will finish heifers well.

TIME AND METHOD OF SOWING.

We may leave aside altogether the method of allowing land to tumble down to grass without seeding or manuring. Sowing has often been done with a corn crop in the spring, and whilst it is recognised that some cereal crops are better adapted than others for this purpose, both winter and spring oats as well as wheat have been widely used as nurse crops. With all these, wherever the seeding operations have been carried out well, and due regard paid to securing a proper tilth, a large measure of success has been attained. Where land has needed cleaning the method of dead fallowing has been followed and in quite a number of cases these fallows have been sown in August or during the first week of September. In most cases successful "takes" have been secured. In occasional instances a partial cleaning has been adopted and the seeds sown in the spring under rape, this crop being carefully grazed off in the autumn by sheep, the treading apparently helping to develop a good sward from the young seeds. The drilling of seeds has been widely practised, and given a good type of drill this method has proved satisfactory. The seed barrow has also given excellent results, especially where a good tilth had been secured, the land rolled prior to seeding with the Cambridge or Ring roller, and, after sowing, lightly harrowed and finished with a flat roller. In nearly all cases where attention was paid to improving the fertility of the soil, *e.g.*, by applying light dressings of farmyard manure to the bare fallows, or by feeding off rape, or by applications of slag, a good take of seeds has been obtained.

SEED MIXTURES AND SOIL PREPARATION.

The large amount of experimental work that has been done has pointed in the direction of greater simplicity in grass seed mixtures. The very complicated mixtures of other days have practically disappeared because experience has shown that many of the species and varieties of grasses and clovers serve at the best only a very temporary purpose. The factors which need to be emphasised prior to the sowing of seed mixtures are

so well known that they need only be briefly mentioned. As to the desirability of clean land, there is now no doubt whatever ; it is a factor that must be rigidly insisted upon if the best results are to be obtained. In cases where there has been indifference to this important point, the pastures often show patches of bad herbage.

Again, the question of fertility is one that plays a very important part in the early development of young seeds. Where conditions of poverty prevail, a poor or indifferent take is likely to result. The practice of slagging the cereal crop in which the seeds are sown is a good one and experience shows that where this has been done a healthy and vigorous bed of young seeds is generally the result. It must, however, be remembered that clean and fertile conditions may easily be rendered of little account if a good tilth is lacking. The importance of a fine tilth can scarcely be overrated, and in this connection the value of good drainage must also be recognised. Wet conditions are inimical to young seeds in their early stages of growth and generally result in a patchy and unsatisfactory pasture. As to the mixtures themselves, great care is necessary in their selection, and many disastrous results can be traced to a lack of discrimination in this matter. The best seeds are necessarily costly and so-called cheap mixtures have often led to serious disappointment and failure. It is not intended at this juncture to give more than two or three illustrations of mixtures that have given excellent results. The following mixture of seeds was sown on a considerable acreage of land, the pastures resulting therefrom vary in age from four to eight years, and they are steadily improving in quality year by year. The large numbers of stock which these fields have carried during the last few years show that the mixture has proved quite equal to the heavy demands made upon it. For example, two particular fields amounting to 18 acres were sown in 1923 ; one of these was rather thin so far as the wild white clover was concerned, and therefore in the following year a further 15 lb. of wild white clover was harrowed in ; the result was satisfactory and a well-balanced herbage is now established. In the autumn of 1930 5 cwt. of slag per acre was given, and in March, 1931, 1 cwt. of nitro chalk. The stocking up to June of the present year (1931) was as follows : from April 22 to May 7, 62 ewes and 83 lambs ; on May 6, 19 bullocks were added. On June 3 the land was being grazed by 26 ewes and 19 bullocks. This land during the last few years has been heavily stocked each year with cattle and sheep. All have done well, and the pasture has become well established and now approximates in appearance to good old turf. The seeds mixture used in the formation of the above pastures was as follows :

	Tlbs.
Perennial Ryegrass	14
Cocksfoot	6
Timothy	3
Italian Ryegrass	2
English Red Clover	1
Late Flowering Red Clover	1
Alsike	1
Trefoil	1
White Dutch Clover	1
Wild White Clover	1
Total	<u>31</u> lb. per acre.

In the very early stages of these pastures slag was applied at the rate of 10 cwt. per acre and smaller doses of about 5 cwt. per acre were given at intervals of two or three years afterwards.

It may be of interest to compare the stocking of some of our good old pastures which have been down for a very large number of years. We know nothing at all of the conditions under which they were seeded; probably they were self sown, or it may be that the seeds obtained from the bottoms of haystacks were used. There is, however, plenty of information as to the system of management pursued on these pastures, recorded by several observers during the last 60 years. The best of these pastures have received very little more than the droppings from the sheep and cattle which have grazed them. Many of them have never received fertilisers of any description, they have never been mown, and cakes or other concentrated foods have never been used. Analysis usually shows that the soils are in a fertile condition, usually rich in phosphates, potash and lime, while analysis of the herbage shows that the soil fertility is reflected in a herbage of very superior quality. The truth is, the finishing of full-grown cattle and sheep on this land does not make a great demand upon those constituents of the soil upon which fertility depends. These pastures have always been heavily stocked and well grazed, consequently there is rarely any indication of tuftiness or matted conditions, the constant trampling by cattle and sheep maintaining the surface soil in excellent condition. The scythe may occasionally be used to mow coarse or strong growing patches, and this helps to keep the pastures uniform. During the early part of the last grazing season, 1931, the following notes were made in order to show how some of the best fields were stocked about the end of May:

No.	Fields.	Acreage.	Bullocks.	Sheep.
1	.	9.0	9	12
2	.	5.7	8	—
3	.	28.0	27	25
4	.	13.6	14	14
5	.	16.2	20	22
6	.	14.4	18	22
Totals	.	<u>86.9</u>	<u>96</u>	<u>95</u>

The figures demonstrate a point which is perhaps the most important of all in the art of grazing, *viz.*, adequate stocking of the land.

The above-mentioned fields are in the Market Harborough district, and on the same farm there are fields which were broken up during the war period, put through a course of tillage and then seeded down. Some of these are now in their eighth year of permanent grass and this year successfully finished a medium-sized bullock and a sheep to the acre. Experience has definitely and repeatedly shown that new pastures can be brought to a very high level of productivity in a very short period of time on the medium and heavy loams and clay soils of the Midland Area. It does not follow, however, that high productivity will be maintained if the essential factors in subsequent management be neglected and, of these, adequate stocking is the most important.

The writer used the following comparatively simple mixture of seeds, with occasional slight modifications, for sowing down over 2,000 acres of permanent grass upon land which had been taken over by the War Agricultural Committee, and farmed by it, during the war. The land taken over was in grass, usually of a very indifferent quality, and much of it had not been very well managed. It was all broken up, sown with cereals, chiefly wheat, and finally sown down in permanent grass prior to being given up by the Committee. When many of these indifferent old pastures were broken up, especially upon ridge and furrow land, the upper layers of the soil were found to be full of closely-packed fibrous material, which when ploughed in deeply, decayed very slowly and consequently tended to keep the texture of the soil somewhat spongy. One of the greatest difficulties met with, when it was decided to sow down these fields, was that of obtaining a sufficient degree of firmness in the seed-bed; the spongy undecayed mass below made the seed bed very loose and therefore very liable to dry out. Pasture making under these conditions was rendered very difficult, but much of the trouble was overcome by repeated heavy rolling.

SEEDS MIXTURE.

Perennial Ryegrass	Lb.
Cocksfoot	14
Timothy	10
Rough-stalked Meadow Grass	4
Late-Flowering Red Clover	1
Alsike	2
Trefoil	1
Kentish Wild White Clover	1
Total	34

lb. per acre.

The composition of the above mixture is based upon the valuable data obtained by Armstrong when he made a very extensive examination of Midland grasslands many years ago. He found that tall and meadow fescue were practically non-existent. Sheep's fescue was found in varying quantities, but even this was almost absent on the very best of both the old and recent pastures. On the inferior old pastures it occurred to the extent of about 3 per cent. and in one field it amounted to 7.5 per cent. Dogstail was present in all the pastures and meadows of lower quality. It must, however, be recognised that this grass is indigenous to all these soils. Though it cannot be regarded as one producing a great quantity of leafy herbage, it tends to appear naturally in all newly seeded land and for that reason it was not considered necessary to include it in the above mixture. Moreover, its place in any well-designed mixture should be taken by grasses which yield more herbage and of better feeding quality. The presence of Yorkshire Fog and of varieties of *Agrostis*, together varying from 4 to 10 per cent. even on the best pastures, is striking testimony to the fact that many of the disadvantages of so-called poor species can be minimised by judicious grazing. The early results obtained from this mixture have proved to be quite satisfactory, excellent swards of young seeds being obtained. Subsequent management of the young pastures fell into other hands. Where they passed into the management of those who understood the general principles of pasture-making, the mixture has proved to be completely successful. It has also been used in sowing down permanent pastures, where the object has been to secure good grazing for dairy cows. In most cases where the young seeds were encouraged by moderate applications of slag and other fertilisers, or by occasional light dressings of farmyard manure, and carefully stocked, such pastures are now well established. The soil conditions in the dairying districts are much inferior to those of the grazing areas, hence the greater need and importance of suitable fertilisers in developing the young turf.

TREATMENT OF PASTURE IN EARLY YEARS.

There is a considerable variation in the treatment of the pasture in the early years. It is quite common to graze the young seeds moderately with sheep in the autumn of the first year, but the time during which they are allowed to graze is limited, there being no desire to graze too closely. When conditions allow, it is a common and good practice to roll the young seeds with a flat roller. Much depends upon the former manurial treatment of the land and also upon the quality of the soil, but a moderate dressing of basic slag applied in November

will help to strengthen the clovers as well as the grasses. During the following spring the young seeds may be lightly grazed with cattle and sheep up to about the middle of May, when vigorous growth as a rule begins. All stock should then be removed and the field shut up for mowing. As soon as a reasonable amount of aftermath appears systematic and regular grazing should begin, preferably by cattle, these being replaced later in the year by sheep. These may be run rather thinly throughout the winter at the rate of about three sheep to two acres. This ensures that the harmful effects of poaching are avoided. In the following spring the character of the season must be considered before definitely deciding upon the density of the stocking, and even a little later it may happen that additional stock must be added if the rapidly growing herbage is to be kept under control; the critical period is usually during May and early June. In the early treatment of young pastures and even in the management of good old pastures, inadequate stocking may lead to serious and harmful results; it is generally agreed that more permanent grassland is damaged by under rather than over stocking. Where the soil conditions are only moderately good, then during the second or third year it may be advisable to give a light dressing of farmyard manure, it being generally found that excellent results follow such an application. It is important, however, that the dressing should be a light one, otherwise the field might have to be mown again. This is particularly undesirable in the early stages of the young pasture, overshadowing of the clovers by the vigorous-growing grasses tending towards their suppression. It is not desirable to mow in two successive seasons if this can possibly be avoided.

On the very best soils, or on those of good average quality, the sooner the fields can be regularly and evenly grazed the more rapidly will the pastures establish themselves. As to further treatment, this will depend as much upon the general management as on the quality of the soil. Quite a number of the better fields which were broken up during the war were re-seeded during 1922-3-4 and are now thoroughly established as excellent pastures, having this season finished satisfactorily a bullock and a sheep per acre. This result has been achieved under highly skilled management, coupled with excellent judgment as to the type of stock most suitable for the purpose. The making of a pasture is undoubtedly an art, in which favourable natural conditions play an important part, but its subsequent maintenance and management belong to the realms of the finer arts in which the Midland grazier is an accomplished master.

The care with which he formerly supervised the collecting

of the clots of manure, to be carefully preserved and mixed with road scrapings or ditch scourings and, during the late autumn, applied to the weaker portions of the pasture, is well known. The practice of clot collecting is not quite so general now, but the regular knocking of the clots when partially dry is still much practised and is regarded by the grazier as one of the points of good management. His vigorous persecution of the thistle by hand pulling and spudding, his excellently cut and laid thorn bullock fences—he insists on adequate fencing—the carefully and regularly scoured ditches, the neatly constructed collecting pens, the well-arranged drinking-places—all these show that the art of pasture-making and the finer art of grazing require a unique combination of knowledge, skill and judgment. It may be doubted whether these qualities can anywhere be seen in such a high degree of perfection as in the best grazing areas of the Midlands.

There are areas outside the recognised grazing district where the prevailing Boulder Clays give rise to much poorer soils, as for example the Sixhills district and the districts north-east and west of Melton Mowbray. In these areas excellent fattening pastures are to be found, where the composition of the herbage and the standard of management compare very favourably with those found in the best grazing areas. Such pastures are often the result of very simple seeds mixtures, but they require regular and more liberal assistance in the form of fertilisers. Occasionally good pastures are found on the much poorer soils of the Coal Measures formation which regularly fatten a bullock per acre. These pastures have been developed by the liberal use of fertilisers, adequate stocking and careful management and it is remarkable how such measures can increase the output. The last mixture of seeds described above was used with excellent results upon considerable areas of this type of land.

A few cases of seeding down with mixtures of indigenous seeds have come under the writer's observation. These mixtures have till now been very expensive and so far have only been used under exceptional conditions. At present, there does not appear to be very much difference between these pastures and others sown with ordinary seeds, but time and further experience are necessary before any definite opinion can be formed as to their grazing value.

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IV.—THE POORER MIDLAND AREAS.

GENERAL PREPARATION.

IN the upland districts of Derbyshire, land readily goes down to grass. Even without grass seeds being sown artificially, any bare ground soon becomes turfed over with some kind of gramineous herbage. This readiness to grass-down is in fact one of the chief obstacles to the formation of good pastures in this area, because the grasses which invade the ground under treatment are not exclusively those which form the best grazing sward. Moreover, the latter are somewhat slow to become established and unless specially assisted may be suppressed by the inferior invading species.

The first step in pasture formation under these conditions is, therefore, the thorough eradication of such weeds as *Agrostis* and other creeping grasses, both from the body of the field and from the headlands, corners and boundary fences.

The next step is to improve the condition of the soil with special regard to satisfying the requirements of the superior species of herbage and enabling them to repress the inferior grasses. On sour land *Agrostis* gains possession of the ground and successfully defies the spreading of better herbage. Under these conditions the sowing of good mixtures of seeds without first liming is sheer waste. Much land in this area does require liming before seeding down; nevertheless it is always advisable to have the soil tested for lime requirement to ascertain the weight of dressing needed, if any.

In the cool and humid climatic conditions of the Derbyshire uplands, drought does not often affect the pastures, and even light porous soils will carry good turf if well managed. If kept properly grazed down, limed when necessary, and sufficiently trodden by stock, the finer portions of soil are retained in the surface layers and the best is made of the moisture-holding power of the soil. If acidity is permitted on these light soils, however, earthworm activity ceases and the soil texture deteriorates, close grazing is impossible and the herbage rapidly degenerates into *Agrostis*, which soon forms matted turf of little value.

Heavy soil texture, on the other hand, has the disadvantage of making the land wet and cold and subject to poaching at the beginning and end of the grazing season under the conditions of liberal rainfall and heavy dews, unless provision is made for the rapid removal of excess moisture. Laying the surface up in "lands" of four to seven yards width is the time-honoured method of accelerating the removal of excess surface water. The lands must be drawn up and down the slope or slopes of the field. Mole drains may be run in the bottom of each furrow

to take away any water that may percolate and accumulate at these points.

Wherever the slope is not sufficient to be very obvious to the naked eye, level readings should be taken. It is very inadvisable to assume from ordinary inspection that a field has no definite fall; but if instrument readings confirm the belief that the land is flat, the surface should be laid up in ten-yards lands with a view to pipe draining if necessary.

COVER CROP.

It is not often that autumn-sown corn is advised as a cover crop for permanent pasture seeds on heavy land. The objection to this practice is that any perennial weeds in the seed-bed are thereby given several months' start ahead of the grasses; and after a wet winter the soil may have become beaten down so much as to make a poor tilth for the small seeds. On the other hand, winter corn may be a better nurse crop than spring corn on lighter land which is subject to annual weeds in the latter; and in this case the settled condition of the seed-bed at sowing time may be advantageous.

Summer sowing of the grass seeds in a nurse crop of rape is a favourite practice with farmers on the light limestone soils of the Peak district. The previous crop having been oats cut too late for the stubble to be cleaned in autumn, weeds are eradicated by spring and summer cultivations—the half-fallow—and the pasture seeds are sown from the end of June to the middle of August according to the progress of the cleaning operations. The soil being warm at this time of the year, germination is comparatively rapid and, provided that the seed-bed is sufficiently firm and moist, a good "take" is secured. In land subject to annual weeds, however, sowing should be deferred until several brairds of weed seedlings have been destroyed, otherwise charlock and chickweed may smother a considerable portion of the young grasses. Also it is good practice to defer sowing the rape until some seven or fourteen days after the pasture seeds, to prevent the cover crop smothering the clovers in the early stages: the rape seed is rolled in. Lastly the rape should be consumed before it has formed a dense cover and the grazing should not be pursued too long, otherwise the clovers may be bitten out. Although as much as 14 lb. per acre of rape seed is sometimes sown, it is undesirable to exceed 3 to 4 lb.

MANURING.

While liming, if the soil has a lime requirement, is the first essential, it is very important that the seed-bed for new pasture should be rich in available phosphates. Formerly the standard

Derbyshire practice in this matter was to apply half a ton per acre of coarsely-ground bones, but the present stand-by is basic slag. A moderate dressing of about 5 cwt. of 15 $\frac{3}{4}$ per cent. grade, harrowed in just before sowing the seeds, has a good effect on the establishment of the seedlings; and on such soils as respond to potash, a light dressing of this ingredient may also be applied at the same stage. Yard manure, however, should be held back for surface application at a later date, as mentioned in a subsequent paragraph.

SOWING.

The ideal seed-bed for grasses and clovers is a soil that is firm and moist underneath and fine on the surface. When sowing in winter corn, it is generally necessary first to harrow well to obtain sufficient mould for covering, then to sow the seeds, and cover them by one or two turns with the light harrows. The winter corn should not be allowed to become too high before the grass seeds are sown, March being generally the proper month for seeding in wheat.

When sowing in spring corn, a good take may be secured by first rolling with the Cambridge roller—or twice with the flat roller, sowing the seeds, and covering by light harrowing. April is the usual sowing month; but if the land is ready and the corn firmly rooted, the first opportunity to sow the seeds should be taken.

Drilling the seeds is sound practice, and its advantages are considerable under conditions less humid than those of the Derbyshire uplands. Here the above-mentioned implements suffice for covering the seed, but care is necessary to ensure its proper distribution. If a fiddle sower is used, the light and heavy seeds should be sown separately; indeed, this is worth while whatever the seeding machine; and it is a further wise precaution to sow half the seeds lengthways of the field and the remainder crossways.

SEED MIXTURES.

The ultimate object desired is a close sward of leafy grasses mixed with wild white clover in moderate ratio. Given suitable soil conditions and good management, this object can be attained in the course of years almost irrespective of the composition of the seed mixture; while an excellent seed mixture will fail to make a good sward under adverse circumstances. The benefit derived from rational seeding is that it simplifies and shortens the process of sward formation, largely eliminating the lean, non-productive period which commonly intervenes between the disappearance of the temporary species and the closing up of the turf with permanent herbage.

There is no doubt that perennial rye-grass of the leafy type and wild white clover, associated in the space ratio of about 3 to 1, form a splendid sward under average conditions. If the clover is in greater ratio, the sward is apt to be thin and open, except during the summer, when the clover is at its maximum development; and when too clovery, the grazing is very laxative and unsuitable for young stock, especially lambs. In older pastures the correct balance can be maintained by manuring and management; but in newer swards an endeavour has to be made to increase the stand of bottom grasses.

If no regard might be had to the cost of the seeding or to the yield of produce in the first year after seeding, an attempt could be made to secure a good permanent sward by sowing about 16 lb. of indigenous perennial rye grass and 2 lb. of wild white clover, without any temporary species. Such a mixture would produce very little hay in the first year; but it would be more satisfactory for grazing.

Where a hay crop is expected in the initial season, rotation species must be added for that purpose. Heavy seeding of the temporary species, however, must be avoided to prevent over-shading of the smaller permanent plants; and a mixture that stands up well at mowing time is preferable to one that readily goes down. For this reason late-flowering red clover, alsike and trefoil should be omitted and only broad red clover sown, the quantity not to exceed 4 lb.; and part if not the whole of the temporary ryegrass should be Italian: common perennial ryegrass is prone to go down flat at mowing time and kill out the bottom herbage. When sowing sufficient indigenous perennial ryegrass and wild white clover to occupy the spaces later left by the temporary species, a light seeding of Italian ryegrass—about 7 lb. per acre—along with 3 to 4 lb. of broad red clover makes suitable provision for the first year.

In order to reduce the cost of the initial seed mixture, common perennial ryegrass is sown in place of part of the full seeding of the indigenous variety. This makes a pasture that is more productive in the first three years, and there is no doubt that some of the common ryegrass becomes permanently established. The same principle applies to the white clovers: part of the very expensive wild white clover may be replaced with New Zealand white or the still cheaper commercial white. The latter gives good grazing for about three years, by the end of which period the smaller seeding of wild white clover has spread and occupied the available spaces. The New Zealand variety is of an intermediate character.

Summarising the discussion of seed mixtures thus far, the prescriptions and approximate prices per acre may be set out as follows:—

	A. Permanent seeds only			B. Including temporary seeds			C. Cheaper mixture.					
	Lb. per acre	Cost			Lb. per acre	Cost			Lb. per acre	Cost		
		£	s.	d.		£	s.	d.		£	s.	d.
Indigenous Perennial Ryegrass . . .	16	1	4	0	16	1	4	0	7	0	10	6
Kentish Wild White Clover . . .	2	1	4	0	2	1	4	0	1½	0	6	0
Italian Ryegrass . . .	—	—	—	—	7	0	2	11	7	0	2	11
Broad Red Clover . . .	—	—	—	—	4	0	6	8	4	0	6	8
Perennial Ryegrass . . .	—	—	—	—	—	—	—	—	10	0	4	2
New Zealand White Clover . . .	—	—	—	—	—	—	—	—	1½	0	2	0
White Clover . . .	—	—	—	—	—	—	—	—	1	0	2	6
Total. . .	18	2	8	0	29	2	17	7	30	1	14	9

While indigenous perennial ryegrass is the principal grass component of the best pastures, special considerations may point to the desirability of including other grasses in the mixture in certain cases. On lightish soil and especially where it is important to counteract a tendency to diminution of productivity after midsummer, a leafy strain of cocksfoot is a useful component of the sward. About 3 lb. per acre, costing 4s., may well be included under such conditions; but where heavy stocking and close grazing are intended, as much as 10 lb. per acre may be sown. One of the most productive pastures the writer has been concerned with was seeded down with a mixture based on indigenous cocksfoot and wild white clover.

Crested dogstail often forms an appreciable part of the sward of good pasture on strong land and it has the merit of winter greenness and growth early in spring. The objectionable feature of this species, however, is its habit of producing in summer the familiar toothbrush-like culms which stock reject. Obviously only a very small quantity of the seed need be sown, and it should not be included where there is likelihood of understocking.

Experience has proved that it is unnecessary to include rough-stalked meadow grass in the seed prescriptions for Derbyshire, as the grass will appear in the sward without artificial sowing. The smooth-stalked variety, however, may well be included on light dry soils and on fields which are likely to be trampled in winter: its creeping root habit enables it to spread and fill up bare places.

Hitherto little success has followed one's attempts to secure by seeding the permanent establishment of timothy grass,

which occurs naturally on heavy moist soils. Now that indigenous grazing strains are available, however, 2 to 4 lb. per acre, costing 1s. per lb., may well be tried under the conditions stated.

AFTER-MANAGEMENT.

In the first autumn after sowing, the same general principles apply here as to an ordinary rotation lea. Moderate grazing by sheep may be permitted when and while the bite is sufficient, but close and late eating is likely to be detrimental to the seedlings.

If yard manure is available, a dressing applied about December will not only nourish the young plants but also assist by protecting them against wind and frost. Moreover top dressings rich in organic matter promote tillering of the grasses and hasten the formation of the thin top layer of soil rich in humus, which accounts for the superior drought-resisting properties of good old pastures.

Whether to mow or to graze in the first lea year depends on the circumstances of each case; but ordinarily it is sound practice to take one crop of hay, mowing early to relieve the bottom grasses of the shading if the yield is heavy. If the field is grazed instead of mown in the first year, the assistance of the mower should be utilised to prevent seeding and the consequent spreading of culm-producing grasses. Until the surface has become firm and sufficiently turfed, heavy cattle should be admitted only in reasonably dry weather; and an occasional rolling to smooth the surface and facilitate top drainage is desirable on heavy land.

Assuming the soil has been properly fertilised at the outset and that a suitable seed mixture has been sown, no appreciable "lean" period should mark the transition from temporary to permanent pasture. A second dressing of slag after the third season may be advisable, if spring top dressings including phosphates have not been used; but considerable benefit is derived from about 3 cwt. of complete fertiliser in March; and this may be given each season from the third onwards, excepting the years when a light top dressing of dung can be spared. The mixture should be sulphate of ammonia 1, superphosphate 3, potash salts 1, parts by weight.

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V.—THE ESTABLISHMENT OF PERMANENT GRASS WITH SPECIAL REFERENCE TO THE SOUTH-WEST OF ENGLAND.

THE difficulties of obtaining a plant of grass and clover for permanent grass are often exaggerated and are often blamed for the absence of good permanent grassland farming in certain districts of low rainfall. The real difficulty is not so much that of obtaining a "take" as of maintaining the right kind of turf once it is established.

In going from the West (say Ireland) to the East, there are certain noticeable changes in important characteristics of permanent grassland. They are not due to the methods of sowing down, nor to the methods of grazing, nor entirely to the amount of rainfall per annum. They are mainly due to climatic conditions in spring and summer and especially to the increasing liability, the farther east one goes, to recurring periods of droughty weather when evaporation is intense. The low rainfall is often given as the reason for the difficulty in maintaining permanent grass in East Anglia; the rainfall in East Northumberland is also low, but in the North periods of intense evaporation in spring and summer are more rare. They are still rarer in Ireland, where farmers complain about a drought and burnt-up pastures, when to English eyes the grass is still green. So congenial to good grass is this moist climate, with no rapid drying of the top soil and turf, that old pastures in Ireland exhibit a good deal of that "long ley" appearance and "bloom" which are generally associated with rich grazing.

Even in the South-West of England with its 30 to 35-inch rainfall there are areas, such as the Cotswolds, where the maintaining of good grass with its vigorous wild white clover and perennial ryegrass is difficult, if not impossible, because of recurring spring and summer droughts with intense evaporation. Two successive seasons of that type wipe out a big proportion of the better constituents of the herbage. This happened in 1928 and 1929 on the Cotswolds. Yet there is no particular difficulty in getting a good start with young plants for a permanent pasture, provided that certain precautions are observed.

TIME OF SOWING.

When the seeds mixture is intended for a short or long ley there is in most districts only a limited choice of time for sowing. A ley usually has to take its place in a more or less fixed rotation with a cereal as a "nurse" crop. If the habit of using a cereal as a "nurse" could be discarded and the "small seeds" sown alone at a time when conditions were suitable, fewer failures due to spring and summer drought would be experienced, because

in the South-West, with its relatively mild climate, grass and clover seeds can be sown without much risk as late as September. When permanent grass is the object, then, it is frequently better to wait until all risk of serious drought is past, and to sow with rape or with no "nurse" at all. For late summer and autumn sowing, no "nurse" is probably the better practice, as the rape stalks are never properly cleared, and are a nuisance the next season either as woody dead stalks or as living plants giving rise to troublesome new growths the next spring.

So long as a "nurse crop" is considered of some importance the time of sowing will be restricted, but in the South-West there is usually the chance of re-sowing or patching after harvesting the "nurse" crop, when moisture conditions are favourable for quick germination and growth. It is more important to get the new seeds in at the right time and under the most favourable conditions, than to remove the last traces of weeds by cleaning the seed-bed and thereby missing a good opportunity. In recent years some very successful "takes" of permanent grass have been secured on land very subject to spring and summer droughts, but sowing has rarely taken place before July or August.

METHODS OF SOWING.

It is well known that grass and clover seeds like a firm seed-bed with a fine tilth. If the time of sowing is restricted, it becomes a matter of luck whether the soil conditions will be just right.

In 1929 about 150 acres of an arable farm, on brashy limestone soil near Bath, had to be sown away. The farm had been let for open-air milk production on the Hosier system. The land was in a run-down condition, much of it weedy corn stubbles. Although the whole of the 1929 season was available for the work, the resources in labour and implements were very limited, so that the work had to be tackled piecemeal, beginning with the cleanest and best land. No harvesting implements were available, so corn "nurse" crops could not be used. Fields which had been prepared were sown as opportunity offered. About 80 acres were sown with no cover crop in spring and early summer, beginning in March. About 30 acres were sown with a pea and oat mixture which was mown for hay, and 40 acres were sown in July with rape as a "nurse" crop. Some winter ploughing had been done, but most of the land was spring ploughed. A little of the cleanest land was sown on the back of the furrow, but most of the land had to be cleaned. One tractor and one team of horses were available. Alternate rolling—with a heavy ring roller—and harrowing was repeated until the seed bed was firm enough. The seed was broadcast on a surface left by the ring roller, lightly harrowed in with Parmiter harrows, and the

land was finally rolled. The season was a particularly dry one, but the "takes" were uniformly good; in fact, the whole of the 200 acres gave an unusually satisfactory turf. The land was cleaned as far as possible, much couch was burned, but every opportunity was taken of getting in the seeds under favourable conditions.

Coulter-drilling grass and clover seeds for permanent grass has not always given satisfactory results. The condition of the tilth should be wellnigh perfect and the coulter very near together, if satisfactory distribution of seed and proper depth of sowing are to be attained. Under perfect conditions considerable economy in seeding may be effected by coulter-drilling, but this is rarely experienced in practice. It is not uncommon to be able to distinguish individual drills as low ridges overcrowded with grass plants for some years after sowing. Between these drills are spaces in which probably wild white clover is the only representative of the plants originally sown; whereas if the field was not too clean these spaces may contain far too many undesirable plants. Drilling half the mixture one way and half in a direction at right angles to the first, is an improvement, but is not as good as broadcasting. A further trouble with coulter-drilling arises if the tilth is rough. The workman is inclined to lower the coulters, which, of course, proves fatal to the seeds mixture. On a rough tilth, even if the coulters are lifted right out, or if the seed is broadcast and then rolled in, the small seeds are liable to be buried too deeply and lost.

SEEDS MIXTURES.

The value of wild white clover in permanent seeds mixtures needs no emphasis nowadays. Its position as the first essential constituent of a mixture is firmly established. And, if this were needed, it is proved each year over and over again in county trials (*e.g.*, in Somerset). Unbalanced mixtures, however, often produce swards full of wild white clover but definitely weak in grasses, lacking in bulk and ability to carry a good head of stock. Such pastures of good quality but low productiveness have repeatedly cropped up in pasture competitions in the South-West, *e.g.*, Herefordshire, and in other districts. They are the result of sowing down with (*a*) a weak mixture on land which develops a good clover sward naturally, or (*b*) a mixture containing plenty of wild white clover but too few grasses capable of establishing themselves quickly.

The day of the very complicated mixture is past; the simpler mixture of the Cockle Park type has repeatedly shown itself superior in the South-West, as elsewhere.

The mixture used on the farm near Bath, referred to above, was—

16 lb.	Perennial Ryegrass (Ayrshire)
10 "	Cocksfoot
4 "	Timothy
1 "	Rough-stalked Meadow Grass
3 "	Red Clover (Dorset Marl)
1½ "	Wiltshire Wild White Clover
½ "	Kentish Wild White Clover

—
36 lb. per acre.
—

In experiments conducted in the South-West a very similar mixture has done well and has generally proved best (see Reports on Field Experiments, etc., published by the Somerset Farm Institute, Cannington, over the signature of W. D. Hay, the County Organiser).

The two standard mixtures used in these trials were:—

	A.	B.
Italian Ryegrass	—	6
Perennial Ryegrass	16	10
Cocksfoot	10	10
Timothy	4	4
Broad Red Clover	—	3
Late-flowering Red Clover	4	3
Trefoil	1	1
Wild White Clover	1	1
	36	38 lb. per acre.

In deciding on a mixture the following points are worthy of attention:—

(1) The objections to mixture A are a tendency to lodge if cut for hay, and lateness in providing spring grazing in the first year or two; also slowness in developing an aftermath. The late-flowering red clover is apt to develop a semi-prostrate habit and lie so close to the ground that it is impossible to catch it all with a mowing machine. A still more important objection is its tendency to smother and check the wild white clover, especially in leys repeatedly cut for hay.

(2) In mixture B, an attempt has been made to get over these objections. Italian ryegrass helps the crop to stand and produces an earlier spring bite in the first year. Its tufty habit of growth, however, does not help a new turf to knit together well. Broad Red Clover is, of course, less persistent than the late-flowering strains, but this is not always a disadvantage for permanent grass when the persistent strains check the wild white. Broad Red stands up better and produces a better aftermath. Mixture B is, however, a compromise; it is very suitable for a three years' ley on farms which must provide seeds hay, an aftermath and an early spring bite.

(3) The first mixture given above the one used near Bath, has produced excellent swards which with careful grazing

during the first year or two, have developed quickly and now carry Hosier plant and dairy cows exceptionally well. The inclusion of Rough-stalked Meadow Grass is usually well worth while. It does well in most parts of the South-West and no grass gives greater assistance in establishing a thick sward in districts which suit it.

(4) In the first mixture the wild white clover seeding was heavy, but the use of locally-grown seed made it inexpensive.

(5) Reference should be made to two "insurances" when permanent grass mixtures are required for poorer conditions in the South-West. On some of the hilly land, especially that which has a strong inclination to grow bracken, it is often difficult to establish perennial ryegrass. In such cases part of the ryegrass seeding should be replaced by Crested Dogtail—but only on those poorer classes of land. Again, on land where Red Clovers are liable to fail, Alsike is often used instead, and sometimes even Trefoil for leys. For permanent grass where the hay crop in the first year is not so important, Wild White Clover may be sown as the only clover.

(6) The use of these productive mixtures, including a heavy seeding of Cocksfoot, can only be advised where stocking is adequate and grazing properly attended to. For open ranges and large enclosures, *e.g.*, on the Downs, the Cocksfoot in these mixtures is liable to become coarse and difficult to handle under light sheep or mixed grazing. Under such circumstances it is usually better to rely on Perennial Ryegrass, Timothy, Rough-stalked Meadow Grass and Wild White Clover. If such extensive grassland is regularly mown and the aftermath only lightly grazed, Cocksfoot is still more liable to get out of hand. With adequate cattle grazing, *e.g.*, with Hosier plant, Cocksfoot is a very valuable ingredient.

Another case where very productive vigorous mixtures are not always desirable, is that of grass orchards. Usually only sheep can be used and the time of grazing is apt to be limited.

For such purposes—

24 lb.	Perennial Ryegrass
3 "	Rough-stalked Meadow Grass
1-2 "	Wild White Clover

28-9 lb. per acre

forms a satisfactory mixture.

Again for this purpose the Kentish Wild White Clover cleanings, often obtainable at a reasonable price, can be made the basis of a mixture. They contain mainly Indigenous Perennial Ryegrass, Crested Dogtail and Wild White Clover, and can be supplemented by commercial Perennial Ryegrass and a little Rough-stalked Meadow Grass.

AFTER-MANAGEMENT.

The treatment of the new grass in its first year or two is bound to depend to a large extent on whether it is intended merely as a long ley and therefore to fulfil a number of definite requirements in the arable rotation or whether the main object is to establish good permanent grass. On some of the sheep farms in the South-West, and especially on those producing early lamb, an early bite on fresh land is invaluable. For that reason Italian Ryegrass is practically always included in seeds mixtures for short and long leys. These leys may then be grazed in autumn after harvesting the "nurse" crop, and again in spring as soon as a bite of the earliest grass is available. The autumn grazing can do a great deal of harm to the ley if it is undertaken without thought or care; on the other hand, it can do a great deal of good if it is done at a time when the moisture conditions are right for consolidation by means of treading without unnecessary "poaching." Early spring grazing is bound to be hard on a pasture and cannot be advised in the case of pastures which are intended to remain down permanently.

The question as to whether new seeds should be grazed or mown in their first year, always gives rise to controversy because both methods are subject to abuse, whilst either, if it is managed correctly, will provide a perfectly satisfactory way of dealing with the first crop. Hard grazing, especially spring grazing in their first year, scarcely gives the newly established grasses a chance. They get no better chance if a late crop of hay is taken after most of the grasses have seeded. Reasonable grazing in the first year, provided the stock are kept off when the land is too wet, is probably the best means of ensuring good tillering and a thick sward, but the grazing should not commence too early. Taking an early crop of hay, the earlier the better, ensures that the new plants shall get every chance of becoming established and shall not be weakened by seed production.

The necessary fertilisers should be applied either just before sowing, or after harvesting the "nurse" crop. They should always include a suitable phosphate such as a high-soluble basic slag. To this a potash manure is often a desirable addition, not only on light land but on all kinds of land if the new grass is intended to produce mainly hay, or if it has not received farmyard manure for some years. Nitrogen can be and has been used for the special purpose of producing an earlier and bigger bite on the shorter leys. It has also been used successfully in the South-West on the aftermaths of newly established permanent grass in order to prolong late summer and autumn grazing for dairy cows. Its effect on the new grass and on the hay crops has been good.

New grass, like other crops, develops best and competes most successfully with weeds on land in "good heart." If exhausted arable land is to be sown away to grass, a complete mixture of fertilisers will give the grass the best start. In those districts where long leys, now often remaining down for indefinite periods, are in regular use, grass land is associated with good arable farming and the land is in good condition when sown down to grass. On some of the upland arable districts in the South-West, much of the land sown away since 1921 was exhausted and poor; as grass, it was often badly watered and could only be lightly grazed. Yet land of this kind, on the Downs and on oolitic limestone in Wiltshire, has responded markedly to applications of superphosphate coupled with hard grazing by dairy cows fed with concentrates.

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VI. THE VALUE AND USE OF INDIGENOUS STRAINS.

IF we are to be intelligible we shall have to devote no little space to a consideration of the exact significance which is to be attached to a number of words which are nowadays commonly applied to herbage plants, while if we are to discuss the value of "indigenous strains," and put forward suggestions as to their use, it is necessary to make perfectly clear what is precisely meant, and to indicate the dangers that are implicit in descriptions which are not sufficiently explanatory or which are actually misleading when applied to plants, and more particularly when applied to seeds.

INDIGENOUS AS APPLIED TO SPECIES.

A plant is indigenous if it is native to a particular country and has never been introduced, that is to say, it is indigenous if before man started moving from country to country and before he started to manipulate natural habitats somewhere in a particular country under review such a plant existed and flourished in a habitat, no matter of what type, that was sufficiently congenial.

Indigenous plants may be widely or only locally distributed, and owing to the now devastating activities of man, many of them are of course to be found in habitats infinitely more varied and complex, and altogether less restricted, than would have been the case in prehistoric times. It is often difficult to determine the precise status of a plant, that is to say, whether it is an alien (a plant which has been advisedly or accidentally introduced, either as a result of the direct or indirect activities

of man or as the result of some unusual natural occurrence) or truly indigenous. A number of plants occurring naturally in Britain are demonstrably alien, while others, although long established and of widespread distribution in this country, are probably also alien; such, for example, are the poppies and dead nettles which are to-day common weeds of our arable lands.

Alien or introduced plants are then perfectly capable of becoming wild, that is to say, of spreading from one habitat to another and winning for themselves large areas of ground in which to luxuriate without the direct assistance of man; indeed they often do so despite his desires and intentions—for, as Druce has said, “the waif of to-day may be a pest in the next decade”.¹ Of the herbage plants held in high esteem in this country, including those habitually included in seeds mixtures, the great majority are indigenous; they are species, however, which are also indigenous to other European countries and none of them are endemic or restricted to Britain. The most important of the introduced or alien herbage plants are Italian rye-grass, alsike clover, crimson clover and lucerne. Although the above-mentioned introductions may occur to some extent as escapes (as wild plants on restricted habitats, *e.g.*, lucerne on railway embankments, and Italian rye-grass on pastures or meadows as a result of the seed being carried out in hay or sown as an impurity in perennial rye-grass), none of them have become wild (or made a spontaneous appearance) on our British grasslands to any effective extent.

SECONDARILY INDIGENOUS AS APPLIED TO SPECIES.

The state of affairs has been very different, however, in the case of a number of European species introduced in recent historical time into America, Australia and New Zealand. Nothing has been more remarkable than the wholesale, and very largely fortuitous spread of white clover throughout large areas of more or less man-made pastures in North America, over the greater part of New Zealand and over large tracts in temperate Australia, while little less noteworthy is the extent to which perennial rye-grass and cocksfoot now contribute to certain of the man-made grasslands in temperate regions outside Europe. Apart from these two grass species being advisedly sown they have extended their borders (though not nearly to the same extent as white clover) by seed being carried in hay and by other fortuitous means, while to-day in New Zealand cocksfoot is as much a “weed” of thickets and roadsides as in this country.

The fact that the most important of our indigenous herbage species have made themselves absolutely at home in temperate

¹ Druce, George Claridge. “British Plant List.” Second Edition. Arbroath, 1928.

regions in countries to which they have been introduced, and the further fact that in such regions they are prone to exhibit the same degree of wildness as in Britain, is not only a striking, but a very important fact as affecting the British farmer. In order to facilitate a proper discussion of this matter it will be convenient to describe plants which behave in this manner as being "secondarily indigenous" in the countries of their adoption. We should thus speak of white clover as being strongly "secondarily indigenous" in North America and in New Zealand. It is when the seed of secondarily indigenous plants is harvested in the country or countries of their adoption (*e.g.*, cocksfoot in New Zealand and in North America, and white clover and perennial rye-grass in New Zealand), and when a part of such seed is exported to Britain, that the interest of the British farmer is at stake. To this aspect of the matter we shall revert when discussing the "indigenous" strains of the various species now on the market.

INDIGENOUS AS APPLIED TO STRAIN.

The whole question of indigenous plants is altogether more profound than might seem to follow from what has already been said, for a proper appreciation of the significance of strain introduces an entirely new complication. We now know, that is to say "we" as agriculturists now know, or, what is of greater importance, we are now beginning to act on the knowledge, that every species (*e.g.*, cocksfoot *qua* cocksfoot, or white clover *qua* white clover) consists of a large number of hereditary types and forms—that each species is not an entity in itself, but is a complex of a vast number of types that differ profoundly from each other in respect of their external form and intrinsic beauty; in their biological relationships and vital make-up, and therefore in their economic usefulness. When, therefore, we say that a particular species is indigenous to a particular country, it does not at all necessarily follow that every form which contributes to the species, considered as a complex, is so indigenous, nor does it follow that the forms which chiefly people habitats of one general type will be those that contribute to the vegetation in habitats of another general type, although both habitats may be in the same country and not far removed from each other. The matter is further complicated by the fact that the difference in strain representation within the species as between habitat and habitat frequently shows itself not so much in the presence or absence of this or that type or strain in the contrasting habitats, as in a very different proportion of the several types and strains manifesting themselves in the vegetation of the respective habitats.

When the foregoing facts are fully appreciated, it is possible

to understand much which in the past has seemed obscure in relation to the local behaviour of herbage plants and in relation to the vast differences which show themselves in the matter of the usefulness or the reverse of seeds of one and the same species (considered as a complex) obtained from different sources of origin—from different localities in the same country or from different countries.

The truth is that the influence of environment considered in its widest sense and embracing not only soil and climate but also methods of management (*e.g.*, of controlling stock and the manner of using fields as meadows or pastures), when long continued on the same general average has a cumulative selective influence on the types which contribute to the vegetation of any particular area. Moreover, since there is a hereditary basis to the types within the species-complex, if seed is harvested regularly either from the older grasslands or from the young leys (the said leys always being sown with seed taken from similar leys in the same district) in a particular and characteristic region, the inevitable tendency will be in the direction of a selection towards a strong preponderance of certain types (within the species) in particular: of longer-lived types in the case of the older grasslands and shorter-lived types in the case of the temporary leys.

WHITE CLOVER.

It is well known, for example, that wild white clover harvested from the old pastures in Kent gives rise to a very characteristic product (to a white clover complex which does not markedly deviate from a certain range—albeit in itself considerable—of types). It is now known that white clover harvested from other old pastures in this country, in some cases at all events, differs rather markedly from that harvested in Kent; such, for example, is the wild white clover from Wiltshire (this white clover representing a range of types differing somewhat both quantitatively and qualitatively from those of Kentish). By no means does it necessarily follow that because the Kentish wild white clovers are already known to be of immense value that, therefore, the Wiltshire wild white clovers (which are different) are of no value, or even of less value. What would logically seem to follow would be that the Kentish wild white clovers are probably the most valuable for certain districts and uses, while the Wiltshire wild white clovers would be of the greatest value for other (though possibly far more restricted) uses and districts. Let it at once be clearly said that the Wiltshire wild white clovers differ profoundly from the range of types obtainable from the ordinary white Dutch (imported) seed of commerce.

RED CLOVER.

The case of red clover is in the present connection even more interesting than that of white clover. Red clover, like white clover, is both indigenous and wild (in the sense that it occurs spontaneously to a greater or less extent on many types of the older grasslands in this country). The wild (indigenous) red clover, however, differs completely and unmistakably from the cultivated red clovers. The cultivated red clovers were first introduced into this country over 200 years ago, and at first probably wholly in the form of the early or broad red variety. The wild equivalent to the broad red clovers is not to be found in this country, and is probably the indigenous type met with in Southern Europe. There is good evidence for thinking that the extra-late and remarkably characteristic types exemplified by the Montgomery and Cornish marl clovers of this country must have originated from a natural cross between our wild (indigenous) red clover and the introduced broad reds, and it is indeed not improbable that the other late-flowering red clovers have originated in the same way. In general, then, it is not correct to speak of the ordinary cultivated red clovers as indigenous to this country (they are introduced aliens), but having regard to their probable parentage it would be legitimate and indeed desirable to describe the "Montgomery" and "Cornish marl" as quasi-indigenous varieties, a description which might also be defensible in respect of Cotswold and other local late-flowering red clovers.

LOCAL STRAINS.

"Montgomery" and "Cornish marl" are excellent examples of local strains. They have been grown generation after generation on the same farms and with but little admixture with varieties from other localities, and as a consequence they have become stabilised within a comparatively narrow circle of variation in so far as main types are concerned. This question of local strains is extraordinarily important as applied to cultivated red clovers in general. In the case of the alien broad reds, and in the case of the ordinary late-flowering reds (many of which were probably first introduced as aliens, though some of them may be quasi-indigenous) it stands to reason that if a peculiarly heterogeneous late, containing many types and races, is grown for generation after generation (for more than 100 years) on one farm or in one district, the tendency must be to reduce the complex to an average level that suits the conditions and needs of such a district—in fact, for a valuable local strain to develop. Valuable local strains are far more abundant and well recognised in Norway and Sweden than in

this country,¹ not only because of the more considerable climatic range, but probably to an even greater extent because farmers regularly harvest their own seed year after year and are almost independent of seed merchants for their supplies. There is a steady flow of foreign-grown red clover seed into this country which permeates every district, and which over a period of years can hardly leave a single farm untouched, with the consequence—and increasingly so during the last 40 years when farmers have come to rely more and more upon the seed trade and have been to an ever greater extent impressed by the importance of high germination and purity as the chief, and alas! in many cases, as the only criteria by which to judge seed—that valuable local strains which may have been developed, or which were undergoing a process of development, have been totally lost or so badly contaminated as to lose their identity and special usefulness. The implication of “local strain” is to a certain extent now realised—but too late to save and perpetuate a number of such strains which undoubtedly existed and were definitely appreciated as such some 60 or so years ago.

THE GRASSES.

Turning now to the grasses, we can make a main distinction of our indigenous species into those which are habitually included in seeds mixtures and those which are not. Of the species generally included in seeds mixtures by far the most important are perennial rye-grass, cocksfoot, timothy, meadow fescue and rough-stalked meadow grass; of the species not included in seeds mixtures the most important are the bent grasses and Yorkshire fog.²

A further distinction can be made based on the characteristics of the strains contributing to the species. In the case of some species, although there are differences between the strains and types met with in the commercial and indigenous seed respectively, these differences do not appear to be material, the ordinary commercial seed giving rise to plants which are of a pasture type and persistent. Such, for example, is the case with crested dogtail, rough-stalked meadow grass and Chewing's

¹ This is true not only of red clover, but to a lesser extent also of timothy and perennial rye-grass which farmers harvest for their own seed supplies. In Norway there are a number of definite local strains of both timothy and perennial rye-grass—of which the Jædersk perennial rye-grass affords a good example.

² The contribution that these species make to our British grasslands is of course very considerable, and with a better knowledge as to management and utilisation it is not at all unlikely that both species, and perhaps Yorkshire fog in particular, will come to have a quite important place in seeds mixtures for the poorer classes of land.

fescue, and very largely also in the case of Finnish meadow foxtail (it is chiefly on account of marked susceptibility to disease that Finnish meadow foxtail fails in this country). In other species there is an absolutely marked and fundamental difference between the strains and types met with in the ordinary commercial and in the indigenous seed. This is strikingly so in respect of cocksfoot, perennial rye-grass, timothy, meadow fescue and tall oat grass, the commercial seed consisting overwhelmingly of stemmy "hay" types lacking in persistence, and the indigenous seed of late pasture types remarkable for their persistency.

In so far as seed supplies are concerned, perennial rye-grass, cocksfoot and timothy present a very complex problem. In the first place, they are all indigenous to this country; in the second place, since they are also indigenous in Europe generally, seed supplies reach, or have reached, us from countries across the Channel; in the third place, they are all secondarily indigenous in North America and in New Zealand, from which countries seed of one or other of the species is exported to Britain. We will deal with the three species in turn.

Perennial Rye-grass.—The ordinary perennial rye-grass of commerce from Ireland and Ayrshire is probably quasi-indigenous inasmuch as when rye-grass first began to be sown there were considerable introductions from the Continent—it is at all events "cultivated". The methods of seed production have tended to standardise the product in a quite definite and recognisable direction, consequent chiefly upon seed being taken in the early harvest years of short-term leys.¹ The perennial rye-grass now saved from the really old Kentish wild white clover pastures is very different and may fairly be described as indigenous and wild, since, to a large extent at all events, this perennial rye-grass is of spontaneous appearance and owes nothing to having been sown. Such rye-grass bears the same sort of relation to ordinary commercial (Irish and Ayrshire) as wild white clover does to white Dutch, though not to quite the same degree—that is to say, it tends to be leafy and persistent.

As to how leafy and persistent it will in fact be is largely a function of the genuineness as to age of the pasture from which it was taken, and the frequency with which seed is taken from such a pasture. The latter point is probably as important as the former, and equally so as applied to wild white clover. If a seed crop is taken year after year, or every other year, the pasture equilibrium is entirely upset. There will be a considerable shedding of seed and a very appreciable re-establishment

¹ The commercial perennial rye-grass tends to be early, stemmy and not of a persistent type.

of seedlings.¹ It will be the seed of the earlier and more profusely seed-setting strains that will be most abundantly shed, and if these strains are not inherently the most leafy and persistent (and they are certainly not likely to be) in the course of but comparatively few years from the strain point of view the contributing wild white clover and (or) perennial rye-grass will have largely lost its essentially "pasture" characteristics.

It follows then that the indigenous perennial rye-grass of commerce is of necessity a very variable commodity. A further cause making for extreme variability is the practice of "once-growing". To once-grow as a cultivated crop tends to favour the earlier establishing and quicker growing types, a danger which is accentuated if a crop of seed is taken for two or three years in succession. It would seem to follow, moreover, from the researches of Jenkin,² that the process of once-growing is altogether more upsetting to the balance of types within the species complex in the case of perennial rye-grass than in that of wild white clover. In both cases the mother fields need to be extraordinarily carefully chosen, and particularly so in the case of perennial rye-grass.

The precise nature of the seed harvested from a secondarily indigenous species in the country of its adoption will be a function of the operation of three variables. Firstly, the nature of the types and forms that contributed to the consignments of seed originally sent from Europe to the "new" countries; secondly, the soil and climatic conditions of the new country, and thirdly, the type of management under which the seed producing fields are maintained. These influences have been demonstrated in a striking manner by the researches of Bruce Levy and Davies in New Zealand³ and by those of Jenkin in Wales.⁴ The perennial rye-grass harvested off short-duration leys in the Canterbury district is excessively stemmy and short-lived, while that harvested from the best of the old pastures in the Hawke's Bay district is altogether more leafy and persistent. The indications

¹ Exactly the same effect would be produced if hay containing perennial rye-grass were fed out on such old pastures. If the hay had been taken from old swards it would have been the earlier strains that would have ripened their seed—while if the hay had been taken from a ley the matter would be far more serious.

² Jenkin, T. J. (1930.) "Perennial Rye-grass at Aberystwyth." *Welsh Journ. Agric.*, Vol. VI.

³ Levy, F. Bruce, and Davies, Wm. (1929.) "Strain Investigation Relative to Grasses and Clovers. I. Perennial Rye-grass." *New Zealand Journ. Agric.*, XXXIX.

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— (1930.) "Perennial Rye-grass Strain Investigation. Single-plant Trials at the Plant Research Station." *New Zealand Journ. Agric.*, XLI.

⁴ Jenkin, T. J., *loc. cit.*

also are that the best of the Hawke's Bay rye-grasses are more leafy and persistent than our quasi-indigenous and cultivated rye-grasses from Ireland and Ayrshire. This suggests that a certain proportion of leafy and persistent types originally found their way to New Zealand and have maintained themselves under pasture or quasi-pasture conditions. That the proportion of these types reaching New Zealand was limited, or that the climatic conditions of New Zealand are not entirely favourable to them is, however, suggested by the fact that our own indigenous and wild strains of perennial rye-grass from the best old pastures in Kent are altogether more leafy and more persistent (in this country) than the best of the Hawke's Bay rye-grasses. Such a comparison would seem to hold equally true in the case of the best of the wild white clovers (those harvested from old pastures) of New Zealand and the Kentish wild white clovers.

Timothy.—The ordinary timothy of commerce comes from North America and Scotland, and is essentially of the hay type. Indeed, so fundamentally different is it from the pasture types met with as wild plants on very old pastures and elsewhere that it is open to doubt whether the commercial seed represents types which are truly indigenous in Britain. It is of course quite likely that most of the seed that originally went to North America was of European, and not British, origin—while cultivated timothy was itself introduced into this country. Indigenous timothy as such harvested from wild places is not a commercial commodity, though pedigree strains based on indigenous material and (or) on "escapes" from the cultivated types are, or shortly will be, available.

Cocksfoot.—Indigenous seed from wild places is not harvested to any appreciable extent, but pedigree stocks built up from indigenous plants are already on the market. It is in connection with cocksfoot that a general warning can be usefully given as to the use to which the word "indigenous" is often put. The whole value of an indigenous plant turns on its presumptive suitability for use in the country to which it is indigenous, and this of course applies with added force to the strains within a species. Because a strain of cocksfoot may be legitimately described, for example, as "indigenous Dutch" or as "indigenous Swedish," it does not by any means necessarily follow that such a strain would prove of any particular value in this country; it might, but equally it might not.¹

The secondarily indigenous cocksfoot from New Zealand

¹ On the face of it, if such a strain emanated from old swards or natural places it might be expected to be persistent, but this may be more than set off by inherent unsuitability in respect of adjustment to British climatic and disease relationships.

presents interesting features. It is probably derived from seed in the first instance emanating from both Britain and France, and to some appreciable extent it may, therefore, contain types and forms not indigenous in Britain. Since the seed is harvested from areas that have been maintained in permanent grass for upwards of sixty years, selection has tended to be in favour of the retention of the more leafy and persistent forms (*i.e.*, of forms indigenous to Britain). This favourable selection has, however, to a very real extent been set off by the taking of repeated harvests and seed shedding, with the result that Akaroa cocksfoot always gives rise to a certain number of early and stemmy forms, some of which are indistinguishable from the ordinary (and in this country undesirable) French types.¹ New Zealand cocksfoot is always characterised by its relatively excellent winter-greenness in marked contrast to the rapidity with which the Scandinavian strains develop winter burn. The long and open growing season of New Zealand has undoubtedly exerted a selection in favour of plants capable of sustained growth. New Zealand cocksfoot is the best available substitute for genuine pedigree indigenous strains.

PEDIGREE STRAINS IN GENERAL.

Not all the pedigree strains of rye-grass, cocksfoot and other grasses now being produced in this country are necessarily wholly of indigenous origin; in the great majority of cases they are so in the case of pasture types, but in the production of hay types a certain proportion of plants from other countries may be used.

It may be thought that a pedigree strain based on indigenous stocks need not necessarily be superior to seed of the same species harvested from a supremely well-selected old pasture (*e.g.*, in the case of wild white clover and perennial rye-grass). However well bred, such a pedigree strain would not necessarily be superior for all uses—indeed, a well-blended mixture of pedigree strains would be likely in most cases to give the best results. The greatest merit of a good pedigree strain is the element of certainty which could be attached to it. It would in fact be what it purports to be, while seeds harvested from old swards, for reasons previously explained, are bound to vary over a very wide range and may depart altogether too far from the indigenous and wild characteristics which it is intended that they should represent. According as a pedigree strain attains to reasonable genetical purity it will be very largely

¹ At Aberystwyth a selection has been made of a very leafy and early type which, save for its extreme leafiness, has all the characteristics of a typical French cocksfoot. The plants selected may well have been the result of natural hybridisation between a typical French and a typical British pasture form.

independent of methods of seed production. The practice of more than once-growing from élite stocks is not, however, to be recommended since such a practice will be liable rapidly to exaggerate any proportion of undesirable types which the strain may contain, or which may have arisen as the result of contamination with stray pollen. There is no fundamental reason why a pure breeding pedigree strain should not be once-grown in countries outside Britain. The greatest absolute risk would be a complete failure of seed crop owing to the incidence of disease¹ and the possibility of contamination with stray pollen of types vastly different from and wholly inferior to that represented by the strain.

The risk of adverse selection would, however, be very great indeed in the case of a strain which did not attain to something like genetical purity, and in any event deterioration would be almost certain to follow if stocks were more than once grown. From the practical point of view, a pedigree strain of a herbage plant does not need to attain to the same degree of absolute purity as a cereal variety and, owing to the greater difficulties connected with breeding, a considerable proportion of the most excellent of the pedigree strains will not in fact be wholly unimpeachable in the matter of purity. On balance therefore—and especially since a system which would entail more than “once-growing” would in all probability come to be generally adopted—it is desirable that the seed production of our home-bred pedigree strains should be conducted in this country.²

THE IMPORTANCE OF ACCURATE AND FULL DESCRIPTIONS AS APPLIED TO SEEDS.

Under the Seeds Act the nationality of a herbage seed must be declared—this is now not nearly enough. A sample of seed, if it is to satisfy a progressive farmer, should be fully described

¹ In the case of grasses, a large proportion of the strains introduced from foreign countries are very liable to be excessively susceptible to disease (especially to rusts), and it is probably largely on this account that Finnish meadow foxtail, for example, when included in seeds mixtures is liable to be a complete failure. It might well happen that a pure breeding pedigree strain, highly resistant to rust or other diseases in this country, would be unusually susceptible in another country, when the plants would be so reduced in vigour that a remunerative seed crop would be impossible. While if the stock was impure, the selective influence of disease would be very considerable, and as likely as not in the wrong direction from the point of view of usefulness in Britain.

² Taking proper precautions, and with adequate supervision, it would no doubt be found that certain strains in particular could be once-grown in certain appropriate countries without incurring any appreciable risk. The matter demands very careful experimentation; as a start, the writer arranged for the once-growing of a typical Montgomery clover in Canada. The seed so obtained produced a normal crop of typical Montgomery clover when sown in seeds mixture plots in Wales.

in terms of the essential points that have been discussed in this article. Thus of wild white clover it should be made perfectly clear whether the seed is "wild," that is to say, taken from a genuinely old pasture, or "cultivated"—"once-grown" or more than "once-grown." In the case of a pedigree strain, as well as the strain being accurately and fully designated, it should be stated whether "once-grown" or more than "once-grown" from élite stock, and where grown. If such a strain is once-grown abroad, the country where it was grown must be stated to conform with the Seeds Act. Under the Seeds Act the "nationality" of a sample is the country in which that particular sample happened to be grown, and not the country where the strain was originally produced; this is a very important distinction to which the farmer should be fully alive. Nothing is more important to the farmer than to know where the seed he purchases—no matter whether it be a pedigree strain, a wild indigenous strain, or an ordinary commercial strain—was grown.

CLASSIFICATION OF STRAINS OF HERBAGE PLANTS.

Since a proper description of seeds is a fundamental prerequisite to their proper use it will serve a useful purpose if we conclude this general discussion with a brief summary and slight amplification of our categorisation of the strains of the more important herbage species.

In the classification which follows it is to be clearly understood that the main reference is made to the source of origin of the species and strains as such (considered as biological entities) which contribute to the seed as purchased, and only as a secondary distinction, where necessary, to the country where the seed may have been grown.

INTRODUCED ALIENS.—(a) When the species are alien, and, therefore, have no strains representing them in the indigenous flora of Britain, and (b) when the species as such are indigenous but the strains representing the commercial seed are wholly alien.

Cultivated: e.g., (a) Lucerne, crimson clover, alsike clover and Italian rye-grass; (b) the broad red clovers, with certainly some of the late-flowering red clovers and probably also the commercial hay types of timothy.

QUASI-ALIEN.—When the species as such are indigenous, but the seed is wholly of foreign origin, and is such that it consists of an admixture of strains some of which are identical with those indigenous in Britain, while others are different and wholly alien.

Cultivated: e.g., Danish cocksfoot and Danish meadow fescue.

Wild: e.g., Finnish meadow foxtail.

QUASI-INDIGENOUS.—(a) When the variety in question is the ultimate result of a hybrid between an indigenous and an introduced form of the species, and (b) when the seed, though grown

in Britain (or Ireland) is probably an admixture of strains which are truly indigenous and of those which are alien and of hybrids between these.

Cultivated: e.g., (a) Montgomery and Cornish marl, and probably some other late-flowering red clovers and certain of the pedigree strains of timothy, and (b) the commercial perennial rye-grass of Ireland and Ayrshire.

INDIGENOUS.—When the strains are wholly and with hardly a shadow of doubt indigenous to Britain.

Cultivated: e.g., pedigree strains based on indigenous stocks of grasses like cocksfoot, timothy (pasture types), perennial rye-grass, meadow foxtail and meadow fescue with once-grown wild white clover and indigenous perennial rye-grass.

Wild: e.g., wild white clover and to a limited extent wild red clover and other legumes taken from genuine old pastures, with indigenous perennial rye-grass and, to a limited extent, crested dogstail and other valuable grasses taken from genuine old pastures.

SECONDARILY INDIGENOUS.¹—When species which are indigenous to Britain have been introduced into temperate regions of other countries and the seed harvested in those other countries.

Cultivated: e.g., the "stubble" white clover from New Zealand and the perennial rye-grasses from the Canterbury district of New Zealand.

Old Pasture.²—The Hawke's Bay perennial rye-grass and the Akaroa cocksfoot of New Zealand.

Wild.²—Some of the "wild" white clovers of New Zealand and North America.

THE RESULTS OF TRIALS WITH INDIGENOUS AND QUASI-INDIGENOUS STRAINS.

In considering the behaviour of indigenous strains, no attempt will be made to deal with individual lots (pedigree or otherwise). All that is at present necessary is to demonstrate the undoubted

¹ To be absolutely correct this class of seed should probably be described as "secondarily quasi-indigenous" since there is evidence to suggest in the case of the New Zealand cocksfoot, for example, that some of the strains are of French origin, while the same is probably true in respect of New Zealand white clover. While in respect of all species the original seed going to the new countries would have been European in the widest sense—some of it emanating from Britain, some from Continental countries.

² Under "secondarily indigenous" a distinction is made between "wild" and "old pasture" because it is probable that both the Hawke's Bay rye-grass pastures and Akaroa cocksfoot swards are, in the main, or almost entirely in the latter case, due to sowing and not to fortuitous spread by adventitious means; on the other hand, white clover has spread on to many of the older pastures of New Zealand and North America without having been sown. The distinction between "wild" and old pasture is not necessary in the case of "indigenous," because both the white clover and, to a considerable extent at all events, the rye-grass owe nothing to seeds that may have been advisedly sown.

and immense value of indigenous and quasi-indigenous strains and of local varieties considered in their entirety. It is the more remarkable that results as striking as those that will be presented have been obtained, when we consider the high degree of variability that is known to exist as between different parcels of indigenous seed under existing methods of garnering and dealing with same, and also when it is realised that plant breeding, as applied to herbage plants, is yet in its infancy. Broadly speaking, indigenous strains are rather essentially of a pasture type, and it is as grazing plants that they are here chiefly considered. This is not to say, however, that hay types do not exist, and experience shows that with the assistance of indigenous stocks great improvements can be made relative to hay strains. It is well known that some of the leading seed houses have taken an active part with a view to developing pedigree strains of the leafy and indigenous character, and it is very important that the widest possible publicity should be given to the fact that strains of cocksfoot and perennial rye-grass produced by such houses which have been tested at Aberystwyth, though of course varying considerably amongst themselves in degree of excellence, have conformed to the desirable characteristics that are to be demanded and expected.¹

Evidence as to the persistency of indigenous strains is presented in Tables I-V. In all cases the figures have been obtained from trials conducted at the Welsh Plant Breeding Station during the past eight years, detailed reports on which have been, or shortly will be, published. It is only here possible to deal with the matter in a summary manner.

TABLE I.—To show number of Plants and of Tillers per 2½ sq. ft. at the end of the Fourth Harvest Year for Commercial compared to Indigenous Strains. Data from pure plots (in triplicate) all treated in precisely the same manner under uniform grazing conditions.

Species	Commercial		Indigenous		Secondarily Indigenous	
	Plants	Tillers	Plants	Tillers	Plants	Tillers
Cocksfoot	46	166	66	551	46	257 ²
Perennial Rye-grass	38	239	75	679	—	—
Timothy	29	70	50	245	—	—
Meadow Foxtail	45	158	112	900	—	—
Red Fescue	—	—	—	3,543	—	2,941 ²

¹ See also Roberts, R. Alun, and Jones, W.A. (1929.) "Nationality and Strain Test of Grasses (with Observations on Pasture Analyses Methods)." *Welsh Journ. Agric.*, V.

² New Zealand (Akaroa) cocksfoot. ³ New Zealand (Chewing's) fescue.

TABLE II.—To compare the Persistency of Commercial and Indigenous Strains of Perennial Rye-grass and Cocksfoot when included in contrasting Simple Mixtures. Data based on tiller counts with commercial strains placed at 100.

Harvest Year	No. of Centres Averaged	Indigenous Perennial Rye-grass	Pedigree (Leafy) Cocksfoot
1	2	140	112
3	2	148	364
4	2	200	508
5	1	158	524
6	1	No data	658
7	1	No data	1,433

Note.—At most centres hay was taken in the first harvest year and at some centres again in the second—thereafter at all centres the fields were used as pastures.

TABLE III.—To show the Differential Effect of Management on Tiller Production in different Strains of the same Species—Commercial and Indigenous Cocksfoot—the values of the monthly rested pasture being placed at 100. Data obtained on a temporary ley in its third harvest year.

	Monthly Rested Pasture	Fortnightly Rested Pasture	Four-day Rested Pasture
Commercial cocksfoot . .	100	23	14
Indigenous cocksfoot . .	100	85	70

TABLE IV.—To compare the Botanical Composition of Plots sown with simple Indigenous Mixtures with that of the rest of the field sown with farmer's Non-indigenous Mixtures. Average results from numerous centres.

Type of Mixture	No. of Centres	Percentage Tiller Counts			Percentage Ground Covered		
		Sown Grasses	White Clover	Unown Species	Bare Ground	Moss	Miscellaneous weeds
Third Harvest Year : Series I.							
Indigenous Farmer's	25	59	16	25	12	6	—
		34	6	60	27	11	—
Third Harvest Year : Series II.							
Indigenous Farmer's	5	60	25	15	9	—	20
		35	19	46	11	—	42
Fourth Harvest Year : Series III.							
Indigenous Farmer's	4	73	15	12	7	—	5
		40	11	49	9	—	21

TABLE V.—*To show the Effect of Wild White Clover in the Suppression of Weeds (Bent, Yorkshire Fog and Miscellaneous Herbs), Bare Ground and Moss. Data from grouped centres and mixtures (3rd harvest year) represented in Series I of Table IV.*

Average Percentage (Tiller) Contribution of Wild White Clover and Type of Mixture				Per cent. on Tiller Counts		Per cent. Ground Covered	
				Grass Weeds	Other Weeds	Bare Ground	Moss
Farmer's mixture	3.5	per cent.	(1)	50	17	29	14
Indigenous mixture	14.0	"	(2)	46	11	25	9
	13.5	"	(3)	18	9	12	8
	21.0	"	(4)	12	4	11	4

(1) and (3): Average of 11 centres;

(2) and (4): Average of 9 centres.

Tables I, II and III are self-explanatory and demand but little comment. The marked relative persistency of the indigenous strains is beyond dispute in the case of all species for which data are available. It is interesting to note that the New Zealand cocksfoot in respect of tillers per unit of area is very decidedly superior to the commercial, though considerably inferior to the pedigree strains. The relative persistency of the indigenous (pasture) timothy is particularly noteworthy, since this strain, like the commercial, was highly palatable to sheep and was subjected to exceedingly heavy grazing throughout the period of the experiment. The mixtures (Table II) were in the main set out on land rather more favourable to cocksfoot than to perennial rye-grass, and the relative persistency (under heavy grazing) of the indigenous strains of the former species is exceedingly satisfactory and well maintained at all events for seven years. This persistency of the indigenous cocksfoot has been most noteworthy on poor fields at high elevations—up to 800 ft. above sea-level. The effect of heavy grazing as such respectively on the indigenous and commercial strains of cocksfoot is well shown in Table III.

An epitome of the results from an extensive series of trials conducted at numerous centres is given in Tables IV and V. These experiments were designed to test very simple pasture mixtures represented by indigenous strains of perennial rye-grass (on the better fields) and of cocksfoot (on the poorer fields) sown only with rough-stalked meadow grass or crested dogtail and with wild white clover, and in some cases with Montgomery red clover also. (For further particulars as to the mixtures, see next section, p. 124.) These mixtures were set out in plots in

the middle of fields sown with farmer's ordinary mixtures (non-indigenous)—mixtures which did not contain wild white clover. These indigenous mixtures have not failed in a single instance, and at some centres have given the remarkably high figure of 95 per cent. "sown species" contributing to the sward in the third and fourth harvest years. On the average of four centres in the fourth harvest year we have "sown species" contributing 88 per cent. to the botanical composition of the sward—while taking all the figures in the table (Table IV) the contribution of "sown species" in the third and fourth harvest years from the farmer's mixtures is only about 35 per cent. The excellence and permanence of the sward developed from the indigenous mixtures is reflected not only in the smaller contributions made by unsown species (bent, Yorkshire fog and miscellaneous weeds) when compared to the sward developed from the farmer's mixtures, but also in the smaller area of bare ground and in the smaller area covered by moss.

An early and sufficiently abundant establishment of wild white clover is a very important factor in the reduction of weeds, bare ground and moss. This aspect of the use of wild white clover in seeds mixtures is not fully realised by those who advocate small sowings on the ground that on fields suited to it this all-important herbage plant will make a sufficiently good spontaneous appearance sufficiently soon. To this argument two things are to be said; in the first place, with the assistance of phosphatic manures and generous sowing, it is possible to establish wild white clover almost anywhere, and in the second place, the sooner wild white clover starts "to run" on a prepared ley the less will be the weeds, bare ground and moss. Because by a third or fourth harvest year there may be as much, or at all events nearly as much, wild white clover on plots or fields where this was not sown as on those where it was sown, is not an all-convincing argument against sowing this species. The figures in Table IV are a refutation of such an argument, while the grouped averages in Table V show even more strikingly the importance of wild white clover in the formation of good and clean grazing swards.

It will be noted (Table V) that in those farmer's mixtures where wild white clover had come in spontaneously (though slowly) to fair amount (14 per cent.), the reduction in weeds and bare ground was not strikingly less than where the spontaneous entry had been insignificant (3.5 per cent.). Where indigenous and farmer's mixtures having substantially the same amount of white clover (13.5–14 per cent.) are compared, the advantage is markedly in favour of the indigenous (with early establishment of white clover) in respect of cleanness of sward. This advantage is no doubt to some extent due to the effect

of the lasting and indigenous strains of grasses, but that the earlier entry of wild white clover had much to do with it is strongly suggested by the greater cleanness of the indigenous plots with 21 per cent. of white clover than of those with 13.5 per cent.—at the former centres wild white clover established itself not only more abundantly but also more rapidly than at the latter. It should be added that the data presented in Table V are but typical of an enormous amount of direct and indirect evidence that has been obtained during the past twelve years in connection with extensive seeds mixtures investigations with which the writer has been intimately concerned.

THE USE OF INDIGENOUS, QUASI-INDIGENOUS AND SECONDARILY INDIGENOUS STRAINS IN SEEDS MIXTURES.

There are three chief ways in which these strains can be used to the best advantage in seeds mixtures and we will conclude this article by a brief allusion to each.

To Modify Mixtures of the "Cockle Park" Type.—The Cockle Park mixture is usually expected to yield a hay crop in the first, and often also in the second, harvest year and then to give a reasonably good grazing ley for a few years. The mixture for such purposes would be greatly improved, especially for the later grazing years, by a blending of strains within each of the major species, and, from the ultimate grazing point of view, by including wild white clover and bottom grasses in more generous amount than was advocated by the late Professor Gilchrist. The mixture as modified should take a form somewhat as under, in lb. per acre :

Perennial Rye-grass :	
Ordinary commercial	5
New Zealand : Hawke's Bay	5
Indigenous (pedigree or ex wild white clover)	5
Cocksfoot :	
Ordinary Danish	2
New Zealand : Akaroa	3
Indigenous pedigree	3
Timothy :	
Ordinary American	2
Indigenous pedigree	4
Rough-stalked Meadow Grass) and (or)	1-2
Crested Dogstail	
Late-flowering Red Clover (local strains) :	
English (Gloucestershire or East of England)	2
Montgomery or Cornish marl	2
Wild White Clover	1-2
Lb. per acre	<u>35-37</u>

Mixtures for Permanent Pasture or Long Duration Grazing Leys.—The experiments which have been in progress at Aberyst-

wyth for the past eight years afford abundant evidence to show that with the use of good indigenous strains it is possible to produce a first-class grazing sward in a few months. The mixtures employed have been of two main types, the one for land of good fertility at low and medium elevations and the other for land of poorer fertility and for land (no matter what the fertility) at higher elevations. The basal mixtures have been as under, in lb. per acre :

For Good Land :

Indigenous Perennial Rye-grass ("pedigree" or <i>ex</i> wild white clover)	14-20
Rough-stalked Meadow Grass	2- 3
Wild White Clover	3- 4

For Poor Land :

Indigenous Pedigree Cocksfoot	16-18
Indigenous Pedigree Red Fescue	4- 6
Crested Dogtail	3
Wild White Clover	3- 4

These mixtures have usually been sown with 6 lb. to the acre of Italian rye-grass and about 4-6 lb. of rape, and they come for a first light grazing within about 8-12 weeks of sowing. In cases where the farmer insists upon taking hay in the first, and if need be in the second, harvest year, Montgomery or Cornish marl clover is added at the rate of 4 lb. per acre, and the farmer is always strongly recommended to put his field "up to hay" late and to be content with a relatively light clovery and herby hay of very high quality. It is not too much to say of these mixtures that they have proved a phenomenal success, and they have been responsible for creating really excellent pastures on fields which have never before been anything but inferior bent-dominated exercising grounds.

Special Purpose Seasonal Leys.—The writer of this article is convinced that under systems of intensive grassland management the pedigree strain before long will be used for the purpose of creating a sequence of *ad hoc* seasonal leys. Leys each designed to cater more essentially for a particular period during the grazing season. This is of to-morrow, but it is a very real possibility to which the progressive farmer should be alive.

To quote one example, the evidence suggests that a mixture sown with a pedigree red fescue and a pedigree meadow foxtail would produce more and earlier grass than could be obtained by any other combination of species or strains. If it is possible to lengthen the grazing season by the use of inherently early strains then it is possible also to use nitrogen on such strains further and greatly to assist the production of grass when it is most urgently needed—nitrogen in one sense cannot create, it can only act on what is present.

For the data presented in Tables I-V the writer is greatly indebted to his co-workers, Mr. M. T. Thomas, Mr. Ll. Iorwerth Jones and Mr. W. E. J. Milton, while for information on various matters he desires to express grateful thanks to his colleagues, Mr. T. J. Jenkin and Mr. R. D. Williams. For the opinions expressed and for any errors that may have crept into this article, the writer is of course wholly responsible.

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MANURING OF FRUIT PLANTATIONS AND ORCHARDS.

FRUIT growing in this country is carried out under several distinct systems of farming.

In some cases, the holding is utilised wholly or primarily for intensive fruit culture, when the land is usually mainly occupied by mixed plantations of tree and bush fruits or by unmixed plantations of bush fruits, tree fruits or strawberries. On such farms there is also frequently a small area devoted to grass orcharding. In other cases, fruit farming is practiced in conjunction with market-gardening and the relative importance of the two activities varies in different instances. Again, large areas of fruit are grown on intensive or semi-intensive lines on mixed farms, where considerable proportions of the available acreage may be devoted to stock rearing, milk production, poultry keeping, hop growing, cereal farming, &c. Finally, on numerous farms, especially in the West Midlands and in the South-Western counties, fruit is represented on the farm by the "home orchard" where the produce may be either "market" or cider fruit.

It will be evident from the above considerations that manurial practices will vary greatly under the different farming systems. On farms primarily devoted to fruit production, manurial systems will be especially designed to suit the particular needs of the special fruit crops. In the other cases, the manurial programme will often be determined by the relative importance of the fruit crop in relation to the other products of the farm. Thus in many market gardens, the fruit is of less importance than the interplanted vegetable crops, and the manurial practice is accordingly adapted to the special requirements of the latter crops, whilst in many orchards grazing value is of primary importance, fruit being regarded as a more or less profitable "catch."

crop. It is, of course, outside of the scope of the present article to discuss at length the numerous problems presented by attempting to utilise land for dual purposes such as fruit growing and stock raising or fruit growing and market gardening, but it may be stated that, in certain circumstances, these dual systems may be eminently suitable. A few of the problems which they present in relation to the manuring of the fruit crops are mentioned later in this paper.

It will also be evident, on reflection, that the problems of fruit manuring must differ in many ways from those of ordinary farm crops for reasons such as the following :

In the case of fruit trees, we are concerned with plants which are perennials and which are usually intended to occupy the same land for a long period of years. They must survive periods of very diverse weather conditions during their life histories : they are exposed to cold periods in winter and to hot spells during summer, to drought conditions and excessive wet at various times of the year and to gales which may occur at any season.

The nutritional conditions of trees must therefore be such as to enable them to withstand these diverse climatic influences with a minimum of adverse effects, and thus extremes of nutrient condition must be avoided or serious losses are likely to occur.

The root systems of fruit trees are very large and the roots penetrate much deeper into the soil than do those of the ordinary agricultural crop plants, and thus fruit trees will probably differ in "feeding power" from agricultural plants.

Only one particular portion of the tree is harvested—the fruit—the vegetative portion being allowed to extend its growth for many years, thus becoming relatively large and carrying considerable supplies of reserve food materials.

Moreover, the plants utilised for the production of fruits embrace very divergent types, both as regards their vegetative and fruiting characters, from which it is obvious that the manurial problems relating to the various classes may be expected to show considerable variation.

The above points will suffice to show that the manuring of fruit plants is likely to provide many complicated problems, but there are numerous other factors which render the subject still more complex and which must be considered in any particular case if the best results are to be obtained from manurial treatments.

In order to understand clearly the rôle of manuring in fruit growing, it is necessary to consider the general problem of the nutrition of the various fruit plants which are grown and, in this connection, it is essential to realise, at the outset, that manuring is *only one factor* of the general nutritional problem

and that manurial requirements in any given case are largely dependent on and closely related to other factors.

The major factors concerned in the nutrition of fruit plants may be grouped as follows :—

- (a) Materials—including the classes of fruits, varieties, root-stocks in the cases of the majority of tree fruits, and the age of the plants.
- (b) Environmental factors—these include two sub-groups :
 1. Natural conditions—including the climatic factors of rainfall, temperature, sunshine ; soil factors, embracing chemical factors, water supply, &c. ; parasitic organisms—pests, fungi, &c.
 2. Artificial factors or factors introduced by the grower. These include soil treatment—cultural operations and manuring ; control of pests, fungal and bacterial organisms, &c. ; manual operations on the tree, such as pruning, fruit thinning, bark ringing, &c.

A few examples will suffice to illustrate the interrelationships of manuring to the various other factors involved. Thus plums and black currants as classes require “ high ” nitrogen conditions ; apples, gooseberries and red currants, on the other hand, have “ high ” potassium requirements and are susceptible to failure if this element is in poor supply ; varieties and root-stocks behave very differently under certain conditions, some exhibiting strong vegetative tendencies whilst others are precocious and highly fruitful from a very early age, or some may suffer markedly from deficiency diseases where others prove highly resistant and behave in a satisfactory manner ; young plants are naturally relatively “ highly nitrogenous,” whilst old trees show great need for nitrogenous feeding, and if this need is not supplied, eventually become stagnant ; trees under conditions of high rainfall behave in a similar fashion to trees growing under “ high ” nitrogen conditions of culture, whilst dry soil locations in wet districts tend to suppress the high rainfall effects ; low cultural conditions also provide a powerful check to factors promoting “ high ” nitrogen conditions within trees and they may lessen appreciably the effects of potassium deficiency ; pruning operations may produce similar effects to manurial treatment and, whilst manuring may affect the susceptibility of trees to pests and diseases, lack of control of these latter may completely nullify the effects of any manurial applications.

Whilst all these interrelationships must be borne in mind, there are also two further points which require consideration in formulating schemes of manuring fruit plantations and orchards. These are that it must be realised that the manurial requirements

of the trees and bushes are constantly changing throughout the life of the orchard and that manures are applied for special purposes at various stages. With regard to these points, it may be stated that, when a tree is young, the manurial programme is followed with a view to building a sturdy tree which will be capable of carrying good crops of fruit in future years. Thus the immediate object of manuring at that stage is not to mature a fruit crop; later, the system is primarily directed to the production of successions of crops with special qualities, such as dessert or culinary properties or suitability for cider making.

A little experience in feeding trees shows that these ends are not achieved by any one uniform method of manuring and, indeed, it may be stated that in the case of the apple, with certain varieties, the highest qualities of dessert and culinary fruits can only be obtained by following manurial systems which are widely divergent. Thus the highest dessert quality of the variety Worcester Pearmain is only obtained under relatively low conditions of nitrogen feeding, whilst the best grades of Bramley's Seedling for culinary purposes require relatively high nitrogen conditions for their production.

It will be apparent from the statements above that specific recipes for the manuring of fruit can have little practical value. The only sound basis for the intelligent use of manures on fruit trees is a detailed knowledge of the factors concerned in any particular instance.

To use manures to the best advantage, the farmer must learn to diagnose the nutritional condition of his plants and to assess the relative effects of the various factors which enter into the particular case. Thus he must acquaint himself with the peculiarities as regards nutrition of his various plants, with the effects of the special local conditions of climate and soil and with the reaction of his trees, at various stages, to details of management.

In connection with the first of these points—the peculiarities of his plants—it is worth stressing that, at the present time as the result of recent research, it is possible for farmers to obtain for planting purposes closely standardised trees and bushes of the various types of fruits grown, and that attention to this point in making new plantings will simplify many points of management, including manuring, during the life of the resultant plantations and orchards.

Considerable guidance is now also available on the subjects of diagnosing the nutritional conditions of trees and of the effects of the more important natural environmental factors, such as climate and soil, as they influence tree behaviour in the more important fruit areas in this country, whilst the effects of all the more important management factors on both tree growth

and fruit yield and quality have been closely investigated and the main practical effects of these determined.

Space will not permit of dealing with the details of these questions in the present article, but readers may be referred to the numerous publications of workers at the East Malling and Long Ashton Research Stations dealing with the whole range of these subjects and to the Fruit Soils Surveys publications of the Ministry of Agriculture and Fisheries relating to the special subjects of soil and climatic influences. Moreover, County Horticultural Instructors are now in close touch with the more practical results of the Research Stations and are able to give valuable advice on the various aspects of the problems.

MANURIAL EXPERIMENTS ON FRUIT CROPS.

It will be of interest to consider briefly the main investigations which have been carried out in this country on the subject of fruit-tree nutrition, since these illustrate the difficulties of the problem and throw considerable light on the practical problems of manuring.

Prior to 1920, the subject had received scant attention from scientific workers in this country and, indeed, the only investigations of note were those of Bedford and Pickering at Woburn and of Dyer and Shrivell at Hadlow, Kent.

The experiments at Woburn were conducted over a period of twenty-two years on apples, bush fruits and strawberries on two widely different soil types—a heavy clay soil at Ridgmont and a light sandy soil, deficient in potash, at Milbrook.

At the former centre, on apple-trees, both dung at 30 tons and 10 tons per acre and “complete artificials” equivalent in plant food content to 30 tons and 10 tons of dung per acre per annum produced no significant effects either on the growth or fruiting of the trees, whereas large increases were obtained on the same soil from similar treatments, especially with dung, on bush fruits—particularly on gooseberries—whilst vegetable crops and young nursery stock also responded normally to fertilisers on this soil after the removal of the apple trees used in the experiments.

The ploughing in of green crops produced bad effects on this soil.

Although it was realised by Pickering that the results on apples were influenced by the destructive action of spring frosts on the blossom, he formed the opinion that no manurial treatment was likely to be of value for tree fruits such as the apple on soils similar to that at Ridgmont.

Very different results were obtained at the Milbrook Centre. On apples, large increases in crops were obtained both by dung and complete artificials, and it was clearly shown that the major

problem was that of potash deficiency. Similar results were obtained for gooseberries, currants and raspberries, but with strawberries no crop increase followed from any manurial treatment, though dung appeared to prolong the lives of the plants.

In the Hadlow experiments, where apples, plums, gooseberries, currants and strawberries were used, and where the soil is a clay loam overlying a deep bed of heavy clay, crop increases were obtained in all cases from manuring when potash manures were included. The major problem was again demonstrated to be that of potash deficiency.

Since 1920, notable advances have been made on the subject of manurial problems, chiefly at Long Ashton, where the problems have been intensively studied in laboratory, pot culture and field experiments. Workers at East Malling have also made valuable contributions from field experiments. In addition to the work at these Stations, important practical results have been secured on the county council demonstration plots at Hutton, Lancashire; Perdiswell, Worcestershire; and Cannington, Somerset.

At each of the above centres, especially at the two Research Stations, plots containing various classes of fruits are in existence on which striking manurial results can be observed and from which any fruit grower or farmer can learn a great deal which will be useful to him in solving the problems which occur on his own farm.

The nutritional investigations at Long Ashton have been concerned with the following points: the effects of deficiencies of nitrogen, potassium, phosphorus and other elements required by fruit plants to maintain healthy growth; the diagnosis of nutritional problems in the field; the relationships of manuring to materials and environmental factors; and the effects of various factors on yields and qualities of fruits (including culinary and dessert properties, and transport and storage qualities).

The main practical conclusions which may be drawn from the work are as follows:—

Potassium deficiency is the most important manurial problem in practically every commercial fruit growing area in the country, and whilst the deficiency occurs on all types of soils, it is of most frequent occurrence on light soils, on shallow poorly weathered soils of close texture and on heavy soils in wet situations; problems of nitrogenous manuring are highly important for all fruits and especially in connection with the production of dessert and culinary quality; phosphatic manuring does not appear to be of the same importance as potassic and nitrogenous manuring; soil acidity is not a serious problem but highly calcareous soils are often unsuitable for fruit growing, due to chlorosis; grass culture systems induce low nitrogen conditions

in trees ; classes of fruits and varieties have particular manurial requirements and rootstocks may influence manurial problems ; fruit yield and quality may be greatly influenced by manuring with nitrogen and potassium.

At East Malling, the results have also demonstrated the importance of potash for apple-trees on the Research Station type of soil and, in addition, have clearly shown the differential response of varieties and rootstocks to potash manuring.

EFFECTS OF DEFICIENCIES OF NITROGEN, PHOSPHORUS AND POTASSIUM ON FRUIT TREES.

Nitrogen, phosphorus and potassium constitute the three main fertilising elements of manures applied to fruit plants and it is therefore necessary that growers should be informed of the effects of the elements on the growth features and fruiting processes of the plants. The effects are most easily followed if plants are grown under conditions of deficiency of the respective elements and then the deficient element applied to various nutrient levels. This procedure has been followed at Long Ashton both in controlled pot experiments and on field plots, and in this way the following facts have been established.

Nitrogen Deficiency.—Fruit plants suffer more quickly when subjected to nitrogen starvation than from deficiency of any other element, the plants showing serious effects within one season.

The opening of the blossom and leaf buds is delayed, the blossoms are weak and often die ; soon all lateral buds fail to grow and blossom buds are reduced to a minimum. Foliage development becomes greatly restricted and is eventually confined to the tips of weak terminal shoots. The leaves are small, pale yellowish green in colour and may also exhibit reddish tints. Shoot growth practically ceases, the barks become pale brown in colour and the trees are defoliated prematurely, exhibiting at the time of defoliation highly developed, yellow, orange or red tints. Any fruits which are formed remain small and, in "coloured" varieties, are very highly coloured with a red flush, the ground colour, where it remains, being practically white. The flesh of the fruit tends to be white and is hard and crisp and often very sweet though, in the last stages of starvation, sugar development is suppressed and the flesh is rather tasteless and woody. The fruits are long keepers both in a common store and under cold storage conditions. When trees are grown under conditions of low nitrogen, as distinct from drastic nitrogen starvation, then the fruits have valuable dessert properties but are not popular for culinary purposes. If such fruits are produced by this low nitrogen method it is necessary to have regard to the yields obtained *since low nitrogen conditions cut down*

yields in drastic fashion and, in practice, a compromise is usually necessary between yield and quality to obtain the best financial returns.

Phosphorus Deficiency.—The effects of phosphorus deficiency resemble in many ways those due to nitrogen starvation. Thus the opening of blossom and leaf buds is delayed, foliage development is drastically reduced, lateral buds die out almost completely, shoot growth is reduced to a very small amount, leaf size is very small, defoliation is premature and cropping is negligible in amount.

The effects differ from those due to nitrogen deficiency in the following ways: the tints developed on the foliage are of bronze or dull purple shades, the barks remain a duller colour, and the fruits, which are small, are not highly coloured but take on a bronzed hue similar to the characteristic bronzing of the leaves. Nor have the fruits any desirable commercial qualities, being soft and lacking in character. It is usual to find that fruit plants under phosphorus deficiency treatment die earlier than from any other deficiency treatment.

Potassium Deficiency.—This deficiency produces effects which differ markedly from those resulting from deficiencies of nitrogen or phosphorus. The opening of blossom and leaf buds may be hastened and the trees may become well covered with fruit buds whilst shoots die back and even terminal buds eventually become fruit buds. Shoot growth thus becomes greatly restricted or even negligible in amount. Leaf size is decreased and leaf colour is normal in the early part of the year, but later the margins take on a scorched appearance and exhibit the condition known to fruit growers as leaf scorch. In the case of plums, the leaves may also show definite chlorotic symptoms. This is especially evident on the variety Purple Pershore. The barks may be slightly pale, fruits are often abundant but they remain small and may fall prematurely. The harvested crop, at best, consists largely of culls, and the fruits generally retain a dull green, immature appearance, even long after picking time. In ordinary store, many potash deficient fruits keep longer than high potash fruits but, in cold store, they are often susceptible to Low Temperature Breakdown. The fruits also invariably show severe wilting during storage.

MANURIAL PROBLEMS IN THE FIELD.

In the early sections of this paper, the complexities of the field problems which arise in connection with the manuring of fruit trees were discussed and examples of the interrelationships which exist between manuring and other nutritional factors were given. It was stated that manuring can only be intelligently carried out when the grower learns to diagnose the nutrient

requirements of his plants and to evaluate the nutritional effects of the various environmental factors which are concerned at any given time. These factors are largely due to climate, soil and management systems. Subsequently, the main findings of nutritional investigations were briefly summarised and it now remains to discuss some of the commoner nutritional problems which arise in practice and the part which manuring plays in these.

The problems selected for discussion are as follows:—

- (a) Manuring in relation to Grass Cultural Systems.
- (b) Manurial Problems under Market Garden conditions.
- (c) The use of Dung and Nitrogenous, Potassic and Phosphatic Fertilisers.
- (d) The use of Lime.
- (e) Types of Fertilisers to use.
- (f) Rates of Application.
- (g) Time of Application.
- (h) Manuring in relation to Fruit Quality.

(a) *Manuring in relation to Grass Cultural Systems.*

Broadly speaking, it may be said that, in the past, the arable system of fruit growing has been the special method of culture in the Eastern Counties fruit areas whilst grass orcharding has been the popular practice of the Western districts. Sweet cherries in the Eastern areas are, of course, also grown in grass orchards.

The main factor determining the general adoption of the respective systems in the two areas was doubtless that of rainfall, this being relatively low in the east and high in the west.

The nutritional conditions of the trees are very different under the two systems, grass culture effecting drastic nitrogen starvation in the trees and mitigating low potassium effects, whilst cultivation encourages highly nitrogenous growth. For the above reasons, the limiting manurial constituent of trees under grass systems of culture is usually nitrogen and it is only under very exceptional soil conditions that it is found to be otherwise. Now, it has been shown in numerous experiments at Long Ashton that it is extremely difficult to raise the nitrogen content of trees under grass by means of dressings of nitrogenous fertilisers. Thus in many cases annual dressings of nitrate of soda, at a rate of 5 cwt. per acre applied in spring to apple trees under grass, have been less effective in supplying nitrogen to the trees than fairly low cultivation without added nitrogen. It follows from this that cultivation is a cheaper means of supplying nitrogen than nitrogenous fertilisers in cases where substantial responses are necessary and that, if such fertilisers are

to be used on grass to effect significant results, the herbage under the trees will be rendered unfit for stock.

If a grass system of culture is to be adopted, certain points require attention to ensure success, *viz.* :—

A site must be selected which is conducive to vigorous growth, thin dry soils being unsuitable for grass orchard purposes; strong growing sorts of trees must be used and the orchard must be efficiently stocked and grazed; if the above conditions cannot be realised, then the grazing value of the herbage must be sacrificed, nitrogenous fertilisers applied in large quantity or occasional cultivation practised.

It should be pointed out that, in grass orchards, much better growth is maintained under pasture conditions than where hay crops are frequently taken.

Where heavy stocking is practised, manuring should generally be given primarily to meet the requirements of the stock, the usual rules of good pasture management being followed.

Poultry and pigs are frequently utilised as means of maintaining an adequate manurial level in grass orchards. The effects produced by poultry are usually excellent and, in many cases, no other fertiliser treatment is necessary, provided the stocking is sufficiently heavy and the usual steps are taken to move the houses, &c. sufficiently often. Where this method is adopted, the rate of stocking and periods of intensive working of small areas must be adjusted in accordance with the appearance of the foliage.

The effects from pigging have frequently been disappointing and the unsatisfactory results have usually been associated with partial nitrogen starvation or with the development of leaf scorch. These two conditions result from under-stocking and over-stocking respectively. Where the former occurs, nitrogenous fertilisers may be applied or some cultivation given and, in the latter case, the stock should be reduced in number or wholly removed and heavy potash dressings applied—say sulphate or muriate of potash at 3 to 4 cwt. per acre or an equivalent rate of potash salts. Moreover, pigs frequently produce very patchy effects in orchards due to uneven stocking and this results in very uneven quality in the fruits, which greatly detracts from the value of the crop.

A system of low cultivation with occasional or semi-grass conditions provides an excellent means of keeping the nitrogen contents of certain types of dessert apples at suitable levels and, in many instances, these cultural conditions, combined with a certain amount of nitrogenous manuring, will be found to be a convenient and economical method of securing satisfactory yields combined with high dessert quality.

Good cider quality is also associated with low nitrogen con-

tent of the fruit and hence the most valuable vintage fruit is obtained from old trees of only moderate vigour under grass orchard conditions.

(b) Manurial Problems under Market Garden Conditions.

The production of intensive market garden crops necessitates a very high level of manuring and, in particular, nitrogenous manures must be applied in quantities far above the rates required for ordinary arable farm crops. If the various vegetable crops are taken as intercrops between fruit tree rows, it is impossible to maintain separate fertiliser levels for the trees and the interplanted ground crops and, in such cases, the trees are invariably subjected to conditions *above* the optimum level of nutrition to secure the best results. In certain cases, the excessively high nitrogenous conditions seriously affect the growth and health of the trees, sometimes leading to extremely vigorous, unfruitful trees or resulting in stunted and useless leaf-scorched specimens. The latter effect is generally more pronounced on lighter soil areas. The fundamental trouble is the excessively high nitrogenous conditions, and the most profitable method of minimising the effect without lowering the productivity of the vegetable crops is to plant classes and varieties of trees which are best able to stand the conditions and which also yield desirable types of produce under the circumstances. The abnormal nitrogen conditions cannot be countered successfully by any manurial method, although the adequate use of potash manures may serve to prevent stunting and leaf scorch in the trees.

The most suitable class of tree fruit to grow in conjunction with highly manured market garden crops is undoubtedly the plum, which requires plentiful supplies of nitrogen to maintain vigorous growth and for the production of high quality produce. In the most extreme cases "coloured" plums usually fare better than "yellow" varieties, though the variety Purple Pershore is an exception, being highly susceptible to potassium deficiency. If special advantages are to be gained from growing apples in market garden areas, then, on highly manured land, the varieties should normally be restricted to culinary sorts, since the conditions are unfavourable to the production of the highest dessert quality.

Market garden conditions on the whole are suited to soft fruit production, but potash deficiency must be guarded against in gooseberries and red currants and, in some cases, the high nitrogen conditions lead to excessive cane formation in raspberries.

It is perhaps necessary to mention that the various fruits from highly worked market garden areas, as a class, possess relatively poor keeping qualities.

(c) *The use of Dung and Nitrogenous, Potassic and Phosphatic Fertilisers.*

In experiments carried out on bush fruits by various investigators, it has been usual to find that dung has proved more efficient in producing growth and maintaining high yields of fruit than any system depending solely on the action of fertilisers for supplying amounts of nitrogen, phosphorus and potassium comparable to those contained in the dung. These results are in agreement with the general concensus of opinion among practical growers and the high value of dung for soft fruits can be regarded as well established by experiment and practice. Dung also appears to exert a favourable effect on the longevity of these classes of fruit plants.

In the case of tree fruits, dung is usually very valuable for stone fruits such as plums, but for fruits such as apples and pears, where keeping quality and firmness are of great importance, it must be used with caution or unfavourable effects may result. Dung has been proved to be an effective source of potash in several severe cases of leaf scorch and its use in cases of this trouble on heavy soils may be strongly recommended.

Nitrogenous fertilisers are of great value for all classes of fruits in a variety of situations, but it is necessary to study the effects in particular cases very closely and to observe carefully three points, the growth features of the trees, the yields of fruits and the quality characters of the fruits. They generally produce increased yields on bush fruits, stone fruits and pears but less consistently on apples grown under arable conditions. Under systems of grass culture, or "low" cultural conditions, nitrogenous fertilisers usually produce marked results on growth and cropping of all classes of tree fruits, but it will often be found that similar or greater increases will be obtained more cheaply by adopting systems of higher cultivation, and this point will frequently require consideration, especially in apple culture, where an elastic cultural system is frequently desirable.

Where fruit production is greatly increased from nitrogenous manuring, quality is generally appreciably altered. In the case of the apple, red colour is usually greatly decreased and may be almost eliminated, the fruits are softer, more liable to bruise, become relatively poor keepers and are more suited for culinary than for dessert purposes.

Attempts to raise production to excessive heights by means of nitrogenous fertilisers may drive the trees into excessive wood growth, when fruiting may be drastically reduced, fruit size decreased and the tree become affected with nutritional disorders such as leaf scorch or diseases such as scab, canker and die-back.

In cases of potassium deficiency, it is always advisable to

withhold nitrogenous manures since the application of such materials merely serves to aggravate the deficiency. Excellent examples of such cases can be seen on the Research Station plots at Long Ashton. Since potassium deficiency is of such common occurrence in the fruit areas of this country, it is accordingly necessary to use nitrogenous fertilisers on fruits with caution and previously to ensure adequate potash supplies.

Owing to the widespread occurrence of potash deficiency of fruit trees in our large commercial fruit areas, the practical problems relating to the trouble have been much investigated during the past decade and, as a result, much knowledge has been gained relating to the field factors concerned in the deficiency and to the general effects of potash manures on fruit plants. The deficiency is popularly known as "Leaf Scorch" and is the most serious nutritional trouble of fruit trees with which fruit growers have to contend.

It has been shown that serious cases of the deficiency may occur in fruit plants on soils on which ordinary agricultural plants do not normally respond to potassic fertilisers and observations suggest that, with certain classes of fruits (and with particular varieties) such as apples, gooseberries and red currants, an adequate potash supply in the soil should be provided by manuring, even on clay soils, by means of regular dressings of potash manures. Annual dressings of potash fertilisers equivalent to 1 to 2 cwt. per acre of sulphate of potash will usually be adequate to maintain the necessary potash supply, but where extreme deficiencies occur, causing stunting, failure and die-back, then annual dressings at rates of 3 or 4 cwt. per acre may be required over a period of three to five years to restore healthy growth. The great difficulty of restoring potash-starved trees to normal healthy conditions requires stressing since anyone not familiar with the trouble could be excused for not persevering with the potash treatment in many cases, as visible improvement is frequently not observed until two or three seasons of treatment have been given. The slow action of potash manures on fruit trees, with the consequent failure to observe results, no doubt accounts to some extent for the prevalence of the deficiency effects of the element, but comparison with other important fruit growing areas in the world, such as Canada and the U.S.A., also leads to the conclusion that the special climatic conditions which exist in this country increase the requirements of our fruit plants for potassium.

In the section dealing with phosphorus deficiency, it was shown that the effects of starvation from this element are extremely drastic. Experience in the field, however, has failed to show that fruit plants in the important areas in this country ever exhibit symptoms of the deficiency. Cases are known where

agricultural crop plants, pasture plants, &c., fail to make healthy growth on certain soil areas due to phosphorus starvation but where fruit plants of various types flourish without added supplies of phosphatic materials. Although serious cases of the deficiency have not been observed, it has not yet been established that fruit does not generally benefit from applications of phosphates and, until further knowledge has been acquired, it seems safest to apply phosphates in moderate amounts. There does not appear to be any advantage to be gained from applying heavy dressings of phosphates as has been the almost universal practice of fruit growers in the past.

(d) The Use of Lime.

Lime has been a popular "manure" in many fruit areas, especially for stone fruits such as cherries and plums, for which fruits lime is generally regarded as necessary for stone formation. There are, however, no critical data to substantiate this point and the idea seems to have grown from the special suitability of certain calcareous soils for such fruits. No critical experiment in this country has ever shown that "liming" is beneficial to fruits on the classes of soils utilised for fruit growing though, on the other hand, many cases are known where calcareous soils are unsuitable for fruit growing, due to high lime content resulting in the development of lime-induced chlorosis. Observation shows that various fruit plants utilised in this country thrive on slightly acid soils, and it has been the writer's experience that where poor results have been obtained with fruit on acid soils, liming has had negative effects, whereas favourable responses have followed from applications of potash fertilisers.

(e) Types of Fertilisers to Use.

In the past, the so-called "organic" manures such as shoddy, hoof and horn, meat meals, guano, &c., have been held in high esteem as fertilisers by fruit growers, who have regarded inorganic materials such as nitrate of soda, sulphate of ammonia, superphosphate, &c., either as inferior to the former group in action or as producing positively deleterious effects on the various fruit plants.

There are certain special circumstances which have doubtless been mainly responsible for the formulation of these views. In the first place, fruit growing is frequently combined with market-gardening activities for which ample supplies of soil humus are necessary and, since adequate amounts of dung are not procurable, growers have relied mainly on types of organic materials regarded as contributing to the maintenance of humus content. Secondly, the opinion is widely held that fruit plants require a continuous source of food supply over the growing season and

it is thought that this will only be possible from slowly decomposing organic residues. Inorganic fertilisers, containing readily available forms of nitrogen and phosphorus, are regarded as exercising stimulating effects as distinct from normal feeding action. Lastly, it is quite easy to demonstrate how easily injury may ensue from excessive or carelessly applied dressings of the majority of inorganic fertilisers and hence in practice it is easier to use "organics."

There is no critical evidence from which the conclusion may be drawn that organic materials are superior to inorganic fertilisers as sources of plant foods for fruit plants though it might be expected that bulky, hygroscopic materials, such as shoddy, would prove superior to inorganic nitrogenous fertilisers in the case of bush fruits and strawberries, in which cases soil moisture conditions are of such tremendous importance during the fruiting period, and for which reason, where the organic matter content of the soil is low, such materials are to be recommended. In the case of tree fruits, numerous experiments have been conducted in America in which organic and inorganic forms of nitrogen have been compared, mainly on apple trees, and the results have been very definitely in favour of the inorganic forms and especially under systems of low cultivation where nitrogen is most required. No differences have yet been noted in similar experiments at Long Ashton on apples under clean cultivation.

In this country, the form of potash fertiliser to use is of importance. Numerous cases have been reported and observed where serious damage has followed the use of muriate of potash, potash salts and kainit on bush fruits. In such cases, where the injured plants have subsequently recovered, the applications have generally exercised beneficial potash effects from which it may be concluded that the damage is caused by the chlorides in the fertilisers. For this reason, sulphate of potash is recommended for soft fruits and strawberries and this material may be applied without any special precautions. For tree fruits, any potash fertiliser containing a high percentage of potash may be used, but kainit is not recommended owing to the heavy dressings often required in severe cases of potash deficiency and the bad effects on tilth which follow the use of this fertiliser.

(f) Rates of Application.

It is not possible to recommend rates of manurial dressings for general use on fruit plants, since the amounts required depend on the particular circumstances at any given time in each individual case. In deciding rates to apply, guidance must be sought from the appearance of the plants, previous experience of responses to dressings of fertilisers, points of management

premeditated for the season in question, previous cropping and the probability of cropping or the amount of crop actually developing at the time.

Certain general statements, however, can be made relating to the general requirements of certain classes of plants for nitrogen and potash though, again, it is necessary to bear in mind the individual requirements of varieties and the modifying influences of rootstocks. Plants such as the plum and the black currant are gross nitrogen feeders and also require general nutritional conditions to be at a high level. This is probably also true of cherries, though to a less extent. With other fruits, such as the apple, gooseberry, raspberry and strawberry, care must be exercised in practising high feeding since unfavourable results such as excessive growth, liability to disease or undesirable quality of fruit may occur. In the cases of the apple, gooseberry and red currant, it is also necessary to ensure adequate potash supplies before nitrogen is given in quantity. Reference has previously been made to the rates of applying potash manures under various circumstances.

(g) Time of Application.

This subject has been much discussed in the past and still requires much investigation before it will be possible to pronounce with authority on many points.

It is often stated that spring manuring of tree fruits produces vegetative growth, whilst late summer and autumn fertiliser applications induce fruitfulness and feed the developing fruit buds. It is well established that fruit plants normally make the greater portion of their annual shoot growth in the spring and early summer and lay down fruit buds in late summer or early autumn for the production of fruit in the following year, but it does not follow because of this cycle that manuring in the spring will not be efficacious in producing fruit buds or that manuring at the time of fruit bud formation will be particularly effective in forwarding this process. The storage of carbohydrate materials appears to be the important feature in fruit-bud formation and it is a little difficult to see how this process can be substantially aided by the application of fertilisers at the critical period. Nitrogen is perhaps the only element which is likely to enter the plant at all quickly after application under field conditions, even when climatic conditions are favourable for the prompt intake of the material, and it seems likely, according to current views, that accumulation of this element in quantity within the plant may hinder rather than help carbohydrate storage. Potash applications are not quickly utilised by fruit trees as has been previously mentioned, possibly due to soil absorption processes, whilst in the case of phosphorus it has not

as yet been possible to demonstrate that any favourable responses are ever obtained from applications of this element in the field.

In experiments at Long Ashton where both "nitrogen only" and "complete fertilisers" containing nitrogen, phosphorus and potassium have been applied annually to apple-trees under cultivation in March, June and August respectively since 1920, no difference in growth or cropping due to time of application has been evident, but all treatments have effected similar responses over the control "no manure" treatment. All treatments have also failed to influence biennial bearing in the variety Allington Pippin. In America, it is claimed that the application of quick-acting nitrogen fertilisers, such as nitrate of soda or sulphate of ammonia, to apples just previous to the blossoming period increases the "set" of fruit. In plants such as the black currant and raspberry, which fruit mainly and entirely respectively on shoots made in the previous season, it would be expected that greater effects would be obtained from manurial treatments which produce the greatest wood growth and this would be expected from early spring dressings since the bulk of new shoot growth is made before midsummer. It will thus be evident that, at the present time, there is no evidence to show that early spring applications of fertilisers are not the best for the various classes of fruit plants.

(h) Manuring in Relation to Fruit Quality.

Quality in fruits is a very important aspect of the various crops and the best economic results cannot be obtained unless the subject receives the very careful attention of the grower. Quality may be varied by many practices, for example by cultivation, pruning, spraying and bark ringing, so that manuring must be considered in relation to these.

To understand the nature of the effects which manures can exercise on quality, it is necessary to know the characteristic effects of differential supplies of nitrogen, phosphorus and potassium on fruits.

The principal effects have been summarised in the section describing deficiencies, and perhaps the main point which requires further stressing here is the great importance of nitrogen and potassium in practice. The simplest way to ensure suitable quality is first to see that potassium supplies in the soil are adequate and then to vary the nitrogenous level in the fruits by manurial or other methods. It will always be found that quality can be altered very quickly by changed nitrogen conditions and growers should use this fact to the best advantage. In this connection, further mention is necessary regarding the points that low nitrogen conditions, although perhaps giving the

best quality of certain dessert fruits, usually mean *lowered* yields, whilst above a certain level of nitrogenous feeding, both yields and quality fall off. The largest specimens of fruits are not obtained under the highest nitrogen conditions but under conditions most favourable to carbohydrate storage within the fruits and where, in addition, nitrogen is not a limiting factor to growth processes. These conditions are within the range of the extremely high and low levels of nitrogenous feeding under which fruit trees will thrive and must be determined by experience in particular cases.

CONCLUSION.

The present article will achieve its object if it serves to demonstrate to growers the highly specialised character of the problems involved in manuring fruit and to provide a basis for approaching nutritional problems of fruit trees in accordance with present knowledge. All operations in fruit growing are highly technical, but the routine of the fruit farm can usually be considerably simplified and results improved if the principles underlying the various operations are understood and the effects on the trees of various factors which are introduced can be interpreted in terms of vegetative growth and of fruit yields and quality.

It is impracticable to lay down hard and fast rules regarding manuring or any other practice. There is no best method of manuring which can be categorically stated to serve for all time, even for a particular plantation, and the desired results can only be achieved by keeping a constant watch on the fruit plants and applying the necessary treatments according to the principles laid down in this paper, coupled with the results of past experiences.

Much still remains to be learned of the effects of manures on fruit plants, but the present knowledge, if applied in a rational way, is capable of producing considerable effects on the economics of fruit farming.

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NOTABLE FARMING ENTERPRISES: II.

THE FARMS OF MESSRS. CHIVERS & SONS, LTD.,
HISTON, CAMBS.

THE name Chivers has been familiar to British housewives for over half a century in connection with Jams, Jellies and other similar products. It is, however, only during the past twenty years that the name has become equally well known to agri-

culturists, and even now the name of the firm of jam manufacturers is not always connected with the name which for the past twenty years has been so prominent in the showyard in connection with horses, cattle and pigs. This perhaps can be understood, for to lay minds the connection between live stock and jam is not very apparent. The fact remains, however, that Messrs. Chivers & Sons were farmers before they were jam manufacturers, and the present business, one of the largest of its kind in this country, was preceded by a straightforward farming enterprise, was in fact the direct outcome of this enterprise, and has always been accompanied by an ever-growing acreage of farm-land.

The Chivers family have been engaged in farming in and around Histon since 1806. In the year 1850 Mr. Stephen Chivers (the founder of the firm as we know it to-day) was the proud holder of three acres of land. Careful thrift and business management, together with the assistance of friends, enabled him to increase his holding to 150 acres by 1860. The records of these early days show that there came a difficult period when the cultivation of corn became unprofitable and consequently Mr. Chivers decided that corn should in the main give way to fruit. Very little fruit was grown in this district at that time, and Mr. Stephen Chivers was one of the pioneers.

This venture met with considerable success, so much so that, as the acreage was enlarged, it became increasingly difficult to dispose of the fruit crops in the local market. Because of this, Mr. Stephen Chivers started to take much of the fruit by road to Covent Garden Market, a journey which involved two nights en route. Subsequently, most of the fruit was sent to Bradford where Mr. Chivers' sons disposed of it principally to fruiterers, although they occasionally sold some to jam-makers in that district. It was this latter circumstance which caused the sons to suggest to their father that they also might preserve their fruit and turn it into jam on the spot.

Mr. Stephen Chivers, always open to new ideas and ever ready to adapt his farming to changing circumstances, at once responded to the suggestion, and together with his sons pressed along this new development until on June 27, 1873, the first boiling of Chivers' jam was made in a small barn still standing in the firm's estates. An idea of such obvious utility in the hands of practical men soon proved highly successful and it was not long before a factory had to be built to meet the growing demand. This is not a history of the growth and development of a jam factory, but a description of a large and successful farming enterprise. In order, however, to understand and appreciate the enterprise, it is necessary to grasp the intimate connection between the farms and the factory.

The object of Messrs. Chivers in their farming is primarily to supply their factory with the raw material it requires, and everything else is subordinate to this. The factory requires vast quantities of fresh fruit, strawberries, currants, gooseberries, raspberries, plums and greengages. The farms aim at supplying a large proportion of these requirements. This involves a very large acreage of all kinds of fruit. In order to grow fruit successfully, that is such fruit as strawberries, currants, raspberries and gooseberries, farmyard manure is essential, at any rate in the dry climate of the Eastern Counties. Since this cannot be purchased in these days in sufficient quantity at reasonable prices, it must be made. This involves large acreages of straw and quantities of live stock in order to tread the straw down and make manure. Mr. Chivers argues that good live stock are more profitable than bad, and since he cannot grow fruit without live stock, then he will have the most profitable live stock he can. It is no exaggeration to say that the Histon flocks and herds are world famous, yet it should be clearly borne in mind that they are not regarded as an end in themselves, but only as a means to an end, the end being the production of fruit for the factory. In the early days the farms were able to supply more fruit than could be used in the factory, but now, owing to the huge demand for the firm's products, this is no longer the case. In spite of the fact that the fruit acreage has been increased enormously from year to year, it is still only possible to supply a small proportion of the factories' requirements, and large quantities of fruit are purchased from growers in the neighbourhood and even from farther afield.

The advantages of home-grown fruit from the point of view of the factory are many. The factory wants *fresh* fruit, of *high quality* and *suitable variety*. Particularly is this the case with fruit destined for canning. Contrary to popular belief, the variety and condition of fruit for canning is of paramount importance. The canning factory as an outlet for surplus fruit in glut seasons is no doubt an attractive idea, but is feasible only so long as the fruit is of suitable variety, of first-class quality and in prime condition. The varieties most suitable for canning are unfortunately not always the varieties which are commonly grown; moreover, the ordinary grower is not always alive to the importance to the canner of careful picking and of the condition of the fruit.

The objective of the farming operations of Messrs. Chivers & Sons having been made clear, we may now venture to describe the *farming* itself.

The total acreage farmed is 6,819 acres. Of this the Company own 5,726 acres, the remainder being hired. No hired land is

however planted with top fruit. Of the total acreage nearly 2,000 acres are fruit.

The farms are not by any means in one block, though, with the exception of 731 acres in Scotland, they all lie within a twenty-mile radius of Histon. On the face of it, it might seem that it would have been a great advantage, had it been possible, to concentrate the land immediately around the factory. Actually this is not so. The object has been to have two or three farms close together so that they might be worked as a block, but to distribute these blocks primarily on the basis of labour supply, and to some extent (though this is regarded as of secondary importance), on the basis of soil type.

Wherever a large acreage of fruit is cultivated, the problem of pickers is sure to arise. Messrs. Chivers have always been opposed to importing pickers and housing them on the farm in bungalows, a system which is adopted in some fruit-growing areas. They feel that the system is open to many grave objections, particularly from the point of view of the neighbourhood, and they have therefore avoided it on principle. Their experience has led them to prefer labour resident within a mile or two of the farms. Each block of farms is therefore situated within easy reach of three or four villages from whence pickers may be drawn. The acreage of fruit grown on any one of these blocks is regulated by the number of pickers available in the district. Moreover, each block is planted so that, commencing with strawberries towards the end of June, picking is practically continuous throughout the season, finishing with the plums and damsons in August and September. Once a gang of pickers has been got together it has been found highly desirable to keep them employed as far as possible throughout the season, as if a break occurs the gang become dispersed and are very difficult to reassemble.

The land is divided into blocks as follows:—

<i>Histon</i>	. 1,551 acres.	Soil—Gravel loam to clay loam.
<i>Harston</i>	. 1,181 acres.	Soil—Heavy gravel loam and clay over chalk.
<i>Drayton</i>	. 588 acres.	Soil—Heavy gault clay.
<i>Aldreth</i>	. 369 acres.	Soil—Heavy skirt land, and red loam (Greensand).
<i>Shippea Hill</i>	1,533 acres.	Soil—"White Fen" or shell marl.

In addition, there are four farms, each of which is worked separately, one devoted largely to nursery work, and composed of red loam, two heavy clay farms, and another of gravel loam. It is possible that any one of these isolated farms may become the nucleus of a fresh block should it ever be thought desirable.

the position of each having been carefully chosen with a view to labour supply.

The organisation and management of these farms is of considerable interest. Its weakness and its strength lie in the fact that everything turns on one man. Mr. Stanley Chivers is equally well known to fruit-growers, stockbreeders, and poultry-farmers, and is recognised as an authority by them all. While at Cambridge University he studied agriculture, and subsequently took over the control of the farms some sixteen years ago, since when the acreage has not only been very largely increased, but the whole of the farming system has been remodelled with conspicuous success. Practically the whole of Mr. Stanley Chivers' time is devoted to the farming side of the business, his two brothers looking after the factory. There is a central Estate Office at Histon, where a staff of clerks is responsible not only for keeping the accounts, correspondence, &c., but also for keeping pedigree records. With the hundreds of pure-bred cattle, horses and pigs which are bred annually this in itself is no small task. Every farm is on the telephone, and Mr. Chivers is not only in constant touch with the foreman on each block, but he regularly visits every farm on the estate and knows from personal observation the state of every field.

Every block has a foreman. In many cases the foreman started as a labourer on the estate. Mr. Chivers is a firm believer in training his own foremen, and he is always on the look-out for promising young men among his labourers, whom he may train on, either to become foremen, or specialists in some direction. Each block foreman has a second to assist him, particularly acting as a ganger when picking is taking place. The management is very centralised in many respects, and this has great advantages. For example, if the work on one block for any reason gets behind, men, horses and tractors may temporarily be transferred from another block where the pressure is not so great. Again, the stock are centralised. Calves born on one farm may be reared on another and finished on a third. The same applies to sheep and pigs. Obviously such things as steam ploughs (of which two sets are kept), threshing tackle and spraying machinery are centralised. Buying and selling of every description is dealt with centrally.

Mr. Chivers has an assistant, one of whose duties is to co-ordinate the rates of pay for piece work on the various blocks, and to keep in touch with the various requirements of each farm in the way of foodstuffs, manures, seeds, plants, nursery stock, etc., all of which are supplied from centralised sources. In this way Mr. Chivers keeps in the closest possible touch with each farm; he is intimate with every detail at first hand, and his knowledge of the exact situation on every farm is remarkable.

Each year every foreman is given details of the cropping and manuring of every field. At frequent intervals he receives written instructions as to the rations every animal on the farm is to have, and the foodstuffs in the required quantity are provided for him. If he has any questions to ask or suggestions to make (and they are encouraged) he does so direct to Mr. Chivers, whom he constantly meets. As far as cultivations go, these are left very largely in the hands of the foreman himself to use his own judgment. With heavy land this must necessarily be so, but is advisable in any case. During the early summer Mr. Chivers organises visits by the foremen to each farm in turn. Not only are these visits useful in fostering a competitive spirit, but much is learned by discussion and criticism by the men themselves.

With the exception of the Shippea Hill block the greater part of the land is heavy, and much of it is very heavy indeed. This type of land is found most suitable for plums of all sorts, and particularly for Victorias and Greengages, for which Cambridgeshire is famous. As has been explained, every block has its quota of fruit of all sorts, and with risks distributed in this way it is a very rare occurrence for Messrs. Chivers to find themselves without supplies of any particular kind of fruit simultaneously at all centres. The orchards, with few exceptions, are kept under the plough. The exceptions are old orchards, and these are heavily stocked either with pigs or poultry. When plums are planted they are, as a rule, inter-planted with black currants or gooseberries. Plums are spaced 15 ft. \times 15 ft. or 18 ft. \times 18 ft., depending on varieties and the type of soil. Black currants are planted 7 ft. 6 in. \times 3 ft. 9 in. in the first case and 6 ft. \times 3 ft. or 4 ft. 6 in. where the plum trees are 18 feet apart. Varieties of plums are grouped in blocks to facilitate picking, except in the case of self-sterile varieties. The black currants are liberally treated with manure, and the land is kept clean by means of ploughing, hoeing and digging. After perhaps seven or eight years the black currants are grubbed. The resulting plum orchards are subsequently kept clean by ploughs and cultivators with the minimum of hand work.

No fixed rotation is adopted on the arable land. On the heavier land the principal crops are wheat, oats, beans, seeds and silage. Practically no roots are grown, with the exception of a few mangolds, and silage and hay form the basis of the winter feeding of the horned stock. Mr. Chivers is a firm believer in the economy of the silo on this type of land, and for this system of farming. If roots are grown they would need hoeing just at the time when all available labour is required in the fruit. Moreover, the autumn-sown silage crop never fails, how-

ever dry the summer, and the stock thrive well on it in the winter. After the silage crop is cut in July, the land is broken up with steam tackle and bastard fallowed. The bastard fallow plays an important part in the farming system, and most of the seed land is treated in this way, being sown with single cut mixtures and broken up immediately the hay crop is off. In this way the land is kept clean.

On this heavy land a great deal of use is made of steam tackle. No sooner is a field cleared of corn at harvest time than it is steam cultivated or ploughed. This contributes in no small measure to keeping the land clean. Moreover, the land is all ploughed while it is dry, and the autumn sowing is completed before the land becomes saturated and work becomes slow and expensive. No farmyard manure can be spared for any of these crops, as it is all required for the fruit. They are therefore grown exclusively on artificial manure; sulphate of ammonia and basic slag are used in quantity, and the resulting corn crops are satisfactory in every way. On the gravel loams, wheat and oats are still the principal corn crops, but peas and potatoes are also grown. The peas are green peas, which are either picked for market, or saved and harvested for seed. Messrs. Chivers have recently opened a new vegetable canning factory at Huntingdon, to supply which a large acreage is contracted for by local growers.

At Shippea Hill, where the soil is a curious shell marl, characterised by a high water table, an entirely different range of crops is grown. The usual acreage of fruit is accompanied by a large acreage of market garden crops such as cauliflower, cabbage, celery and potatoes. Interesting side lines here are chicory and herbs of various kinds, all of which are dealt with by a drying plant on the spot.

LIVE STOCK.

Histon is a familiar name to breeders of pure-bred live stock of all sorts. It would, however, be wrong to assume that all of Messrs. Chivers' stock are pure bred. Where very large numbers of stock are kept this is not desirable, for with pedigree stock individual attention is essential if the best results are to be obtained. Pedigree stock, however, form the nucleus, and a great part of the remainder are first crosses. With the exception of the dairy herds the whole of the stock is centralised. No animal or group of animals belongs necessarily to any given farm or group of farms, but may be moved from one farm to another as seems desirable.

Four pure-bred dairy herds are kept, two Dairy Shorthorn, one Lincoln Red and one Jersey, the last being in process of formation. In addition a few pure bred beef Shorthorns and

Aberdeen Angus are kept, mainly for the production of bulls for crossing with the large number of cows and heifers which are kept for calf-rearing. These cows and heifers, which are of the shorthorn type, and mainly of Irish origin, are mated with beef bulls to calve in the spring. Every farm has a number of such cattle, the number varying with the keep available. Large numbers of calves are purchased throughout the spring and summer, mainly shorthorn calves from the north of England, and each cow rears from two to five according to her capacity. The calves are weaned when they are about 12 weeks old and are then transferred to certain farms where they are kept in straw yards and fed right on to come out as prime beefings, weighing about eight cwt. at sixteen months old. The cows are dry by the end of the autumn, and are wintered cheaply in yards with a little hay and a small allowance of roots or silage. In this way a good deal of straw is trodden down and turned into manure.

During the last seven or eight years sheep have come to play an increasingly important part in the farming system. While corn-growing was profitable, enough straw was produced to provide all the dung that the fruit required. With the decline in corn prices this became unprofitable, and some modification became imperative. A great deal of land was therefore put down to grass with the intention of preparing it in this way for fruit as and when required. Such grass as existed previously was devoted exclusively to cattle. With a largely increased acreage the possibilities of grassland shepherding became apparent. The north country half-bred (Border Leicester \times Cheviot) is the ewe that is favoured. A flock of about 1,000 of these is maintained. They are crossed with Suffolk rams, the progeny being either fed out as fat lamb directly off the grass, or run on and finished on kale, &c., in the autumn. The sheep are constantly moved from one farm to another as keep becomes available.

Large Whites and Middle Whites are the two breeds of pigs which find favour at Histon, and both herds are famous. Many hundreds of pigs are bred annually, the majority being pure bred. The breeding sows are distributed about on the farms, though a good many are kept at headquarters. They are allowed to run out under the trees in the grass orchards. The best sows are used for pure breeding, but a great many Large White sows are crossed with Middle White boars for the production of London pork.

In spite of two sets of steam tackle and 17 tractors, over 150 working horses are kept. While serving with the Artillery in France during the War, Mr. Chivers was very impressed with the performance of the Percheron horses, so many of which

were purchased from Canada and America by our remount department. Early in 1918 he purchased in France five pure-bred three-year-old fillies, to try on his Histon farms. So satisfied was he with the result that he soon started increasing his stud. To-day the firm owns some 130 pure bred Percherons of all ages and within a few years expect to have no other horses on their farms. Mr. Chivers started breeding from the very first and breeds some twenty to thirty foals each year. Although he has been wonderfully successful in the show ring, he will keep no horse on any of his farms which does not earn its keep at work. Even the stallions are sent to work out of the breeding season. In his breeding operations his aims have been weight, activity and hardiness, and he has been singularly successful in achieving them. He is most emphatic that on heavy land the clean legs of the Percheron are a great advantage, while for such work as grubbing between narrow rows of strawberries the Percheron is unsurpassed.

Twenty years ago the possibilities of poultry in conjunction with the farms were recognised. Not only are the birds themselves beneficial to the orchards, but eggs are required in large quantities by the factory for the production of such articles as lemon curd, &c. All the hatching and rearing is done at headquarters, where a 16,000 Buckeye incubator, and a battery brooder of 12,000 capacity are kept fully occupied during the season. The breeds most favoured are Light Sussex, Rhode Island, White and Black Leghorns. A great many sex linked chickens are hatched, the cockerels being sold as day olds. Some ten thousand pullets are retained each year for egg production on the various farms, where they are housed in semi-intensive houses of 200 capacity. Many of these houses are situated in orchards, in which the birds are allowed to range when the weather is suitable. This large stock of birds utilises a considerable portion of the wheat grown on the farms.

No account of the farming operations of Messrs. Chivers would be in any sense complete without some reference to the labour employed on the farms. The total number of men permanently employed is 370. In addition, some 820 pickers, mainly women, are employed for many weeks during the season. These figures do not include the Scotch estate. The picking is all done by piece work, and the same women, all local, are employed year after year, so that they are very expert, and earn good money.

The regular labourers are not all paid equal wages, but are classified according to merit; all new employees commence at the ordinary minimum rates of pay of the district, and are placed on a higher grade as and when their skill and industry warrant. Men who show intelligence and keenness are singled

out and taught to perform specialist work. As far as possible promotions to the higher posts, as vacancies occur, are made from men already employed on the farms. It is very rare that a man from outside has to be engaged to fill any of the more responsible positions. A great deal of piece work is done all through the year. In the case of strawberries, which occupy the land for some years, pegs are driven into the hedges, dividing the fields into acres. The measurement and control of piece work is thus simplified; moreover, as far as possible, every man hoes the same piece of land all through the season, so that if the work is well done in the first instance, the individual who was responsible reaps the benefit. Everyone who has any experience with strawberry growing knows how important is the planting and hoeing. Careless planting leads to a gappy plant. A record is kept of each man's planting. Months afterwards rows planted by some of the men will prove to be above the average, whilst perhaps the work of one of the planters will prove consistently bad.

The relationship between the men and their employers has always been of the happiest. A co-partnership scheme is in operation whereby men who have been on the permanent staff for five years become shareholders.

As may be supposed, an enterprise of the kind just described is a very real asset to any district. Not only is much employment given, but it tends to raise the standard of farming in the neighbourhood. Unfortunately when, as in one or two recent seasons, it has been possible for manufacturers to purchase fruit from abroad at the price which the same article costs here to pick alone, there is little encouragement for further extension! Let us hope that for the sake of our countryside such a condition of things will never in the future be allowed to recur.

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MR. A. H. BROWN'S FARMS.

THE present agricultural depression is so widely distributed as to make it difficult to locate farming systems which have resisted successfully the bad times through which farming has passed. Success or failure in agriculture, however, must not be judged by one or two years' experience. The farmer must of necessity take a long view, and the true test of successful farming is whether it will maintain its position over a period of years, even allowing for the existence of depressed conditions generally.

In this sense it can be said that a farming system only becomes notable if it can show a satisfactory return for the capital, brains and energy devoted to it. It is sometimes suggested that where successes have been achieved peculiar and favourable circumstances have contributed to that end, and that the systems as such are incapable of wide application. Success may be sometimes accidental. It is more frequently the outcome of a premeditated plan, coupled with the ability of the designer to see it through to a satisfactory conclusion.

The workings of such a plan are well illustrated in the farming system adopted by Mr. A. H. Brown, of Northwood Farm, North Hayling, Hampshire, who within recent years has twice won the challenge cup for the best managed farm, over 300 acres, in the farms competition arranged by the Fareham and South Hants Farmers' Club, and open to South Hants and West Sussex.

Mr. Brown's farming ideals have evolved partly out of a lifetime's experience of agriculture and partly from the fact that he is endowed with a thirst for knowledge and a passion for reading. It is essential to emphasise these facts at the outset, because Mr. Brown attributes much of his success to the knowledge he has gained from the experiments of others. In a previous generation such a confession would have been regarded as a sign of weakness. In these days it is a worthy tribute to the value of educational and research work applied to the practice of agriculture. Rarely is the praise so generous as in the case of Mr. Brown.

Mr. Brown was born in 1885, his father being the tenant of a poor, yellow clay arable-land farm in the Isle of Wight, the rental value of which was about 10s. per acre. He left school in 1900, by which time half his father's farm had been laid down to grass, a small herd of dairy cows being kept. The other half was worked on the typical four-course rotation. In the management of the farm, the dung produced by the dairy herd was applied to the meadowland, while the arable portion was supposed to be kept in good heart by the folding of sheep on the root break, the turnips receiving 4 cwt. per acre of superphosphate, and the wheat a top-dressing of nitrate of soda at the rate of 1 cwt. per acre. Mr. Brown's apprenticeship to farming was of a very practical character. The flock was a "flying" one, and it fell to him to look after it. The character of the land, together with the fact that most of the winters were wet and mild, often produced conditions far from ideal as regards spring seedings, while the opinion was also formed that sheep were not suitable or profitable animals on a clay farm. The sheep were in fact often sold out in spring without leaving any margin for their winter's keep.

Furthermore, since a wet winter was often followed by a dry summer, it frequently happened that the seed lay in the ground until midsummer before germinating, or yet again the ground remained unploughed until rain came. These features of this type of farming very quickly impressed Mr. Brown as constituting a wrong method of farming under those particular conditions. To him it was wrong to have to ride a plough to keep it in the ground, and it was bad business to have to buy sheep when everyone else was buying, and to sell them when everyone else was also selling.

It was at this stage that his quest for knowledge led him to read all that he could concerning the manuring and management of land. Rider Haggard's *Rural England* introduced to him the notable large-scale experiment in continuous corn growing of John and W. A. Prout in Hertfordshire, where a system of cropping was followed dependent upon the use of artificial fertilisers and independent of live stock. He also read the Rothamsted Experimental results bearing on the same subject, while at a later date Sir Daniel Hall's *Pilgrimage of British Farming* created a lasting impression. The cumulative effect of this reading was the decision to dispense with sheep if ever he farmed on his own account.

At the age of 25, Mr. Brown left home to go as working foreman on a 600-acre farm near Winchester. This was a chalk-land farm with soil of varying depth. On adjacent land he observed the successful practice of a neighbour who was utilising mechanical power in the form of steam cultivation, concentrating upon winter-sown cereals and using liberal dressings of artificials. This course of management confirmed Mr. Brown's general ideas as to the usefulness of the system, which was forthwith put into practice by himself.

Three years later, in 1913, Mr. Brown started farming on his own account, renting Northwood Farm, Hayling Island; of this he is still the tenant, the farm being leased until 1940 at a rental of £290 per annum. The area of this holding is approximately 135 acres and when taken over it was a run-down, neglected, weed-infested farm, of which 100 acres were arable. The general character of the farm when taken over can be gauged from the fact that, in 1914, the cereal crops averaged four sacks per acre. In appraising the subsequent developments of this holding it is essential to take stock of the local conditions and the inherent capacities of the soil. Mismanagement of land is a frequent cause of poor results and in distinguishing between the factors which have contributed to the improvement of the farm in question, regard must be paid to the fact that Mr. Brown was sufficiently far-sighted to realise that local conditions were favourable to the application of his ideas in

relation to farming. Hayling Island is situated between the harbours of Langstone and Chichester, and is part of the County of Hampshire. Furthermore, it is a popular and prosperous seaside resort and is developing into a residential area. The soil is a brick earth or silt, the mechanical analysis showing it to contain over 50 per cent. of fine silt-like material. A typical complete chemical and mechanical analysis of the Northwood Farm soil gives the following figures:—

Chemical Composition.

	Per cent. Composition of the Air Dry Fine Earth
Moisture	2.54
Loss on ignition	4.42
Calcium Carbonate	0.16
Nitrogen	0.17
Phosphoric acid (available)	0.004
Potash (available)	0.006
Phosphoric acid (total)	0.163
Potash (total)	0.449

Mechanical Composition.

The soil contains:—

Stones (greater than $\frac{1}{16}$ in.)	2.06
Fine Earth (less than $\frac{1}{16}$ in.)	97.94

100 parts of the air-dry fine earth contain:—

Fine gravel	0.490
Coarse sand	2.136
Fine sand	24.838
Silt	36.931
Fine Silt	14.970
Clay	12.390

It will be readily appreciated from these figures that the soil is one which is not easy to manage in a wet year, but apart from this it belongs to a type which, given suitable management and treatment, can become one of the most fertile in existence, especially when identified with wheat culture. Incidentally the mechanical composition agrees very closely with that of the brick-earth soils of the Chichester district and the original type of farming employed agreed very closely with the methods followed in that area. Thus, when taken over, Northwood Farm was cropped on the four-course rotation, and depended on a sheep stock; indeed it was said that it could not be farmed without sheep. The normal custom was to grow roots and give them to a neighbour to feed off.

The deplorable yields of corn secured by Mr. Brown in 1914 were instrumental in leading him to test out the practicability of eliminating sheep and the substitution for them of artificial manures. Two fields in Upper Westney and Langlands, com-

prising 21 acres, were set aside for this purpose and it is interesting to note that ever since 1914 these have been cropped continuously without the application of dung, the folding of sheep or the ploughing in of green manure. A portion of Landlands, however, was so foul in 1915 that it had to be bare fallowed. The character of the cropping on the Langlands fields, and the yields per acre, give some idea of the results obtained.

Year.	Crop.	Yield per Acre.	
		Sacks.	Bushels.
1914	Spring Oats	2	2½
1915	Bare Fallow	—	—
1916	Wheat	6	2
1917	Winter Oats	15	0
1918	Clover made into hay .	—	—
1919	Wheat	8	0½
1920	Tares	5	0½
1921	Winter Oats	19	0½
1922	Potatoes	6-8 tons	
1923	Wheat	14	0
1924	Oats (Marvellous) . .	19	0
1925	Mangolds	49 tons	
1926	Wheat (Yeoman King) .	12	
1927	Seeds made into hay		
1928	Wheat	13	
1929	Sugar Beet	13-14 tons	
1930	{ White Victor Wheat	18	
	{ Spring Oats (Superb)		
1931	Wheat	11	

The progressive improvement in fertility, as judged by results in cropping, gives ample proof of the soundness of the methods which Mr. Brown has employed.

This type of experience has given Mr. Brown a measure of confidence in still further developing his farming policy, and as a result he has formed fixed ideas on certain points affecting farming methods and outlook. Thus he has no belief in the old rotational methods of cropping arable land, saying that "only a fool believes in rotation." This is a point which has been much debated of late, and it is fairly evident from general observation that many are adopting similar ideas. With Mr. Brown, however, this idea is determined by his belief that a farmer should always grow what will pay best—in other words he should be an opportunist or a speculator. This outlook is from some points of view calculated to disturb agricultural stability, but it is undoubtedly a policy which has paid Mr. Brown. It must not be concluded from this that rotational cropping has had its day, but only that, under the policy of farming followed by Mr. Brown, it is not calculated to give the type and size of turnover which he desires. In this connection it should be observed that though Mr. Brown is a mixed farmer in the generally accepted sense of the term, he does not allow

his live-stock interests to interfere with the general cropping policy of his arable land. Thus there is a fundamental rule, adhered to very closely in practice, of selling off the farm all that can be sold, even including hay and straw, and of buying back all that is required for the live stock. This may sound to be a contradictory and unsound practice, but it should be noted that Mr. Brown is a believer in the high-farming creed, and does not believe in the law of diminishing returns. His ideal is always to grow, with the aid of artificial manures, as much as the land can carry. The result is that he always grows more than can be consumed on the farm, and it is considered, for example, to be more economical to sell cereals and buy back balanced compound foodstuffs for the dairy herd, than to feed home-grown corn.

The period during which Mr. Brown started farming was one particularly remunerative to agriculturists in general, and this fact, coupled with the progressive improvement in crop yields, made it possible for him to extend his farming interests.

Thus in 1918, Eastney Farm, of 84 acres, was purchased, followed by Northney Farm in 1922 and Westney Farm in 1924. A further additional acreage was secured in 1931. These small farms, parts of which had been badly farmed by comparison with Mr. Brown's standards, were purchased privately at about £40 per acre. The total area of owned and rented land at the present time amounts to 510 acres, of which 290 are arable. The main interests are now corn-growing, dairy farming, pig-breeding and poultry. It will be recognised from this that Mr. Brown has focused his attention on branches of farming a majority of which have been paying propositions during the period under review. Equally necessary is it to recognise that he is a believer in extending his farming interests, so far as acreage is concerned, whenever an opportunity presents itself. To this extent he is convinced that the main concern of farming is to produce everything as cheaply as possible, and so to organise that the maximum efficiency is obtained both from the land and the labour.

The actual organisation of Mr. Brown's arable farming presents no really new features. His methods have been well tested elsewhere, but he combines that type of mentality and outlook which, when it is suggested that a certain thing cannot be done, drives him to try the harder and prove that it can be done. Grit and backbone, with ability and confidence, are properly yoked in this instance. In the choice of crops, wheat is regarded as the most suitable for the system of farming followed. Up to the present wheat has proved to be the safest crop to grow, the soil being ideal, with a rainfall of about 25 inches per annum. The absence of a rotation does not, as is

often the case, mean the practice of haphazard cropping. Fallowing has been dispensed with, the cleanness of the ground being secured and maintained principally by stubble cultivation. The arable is remarkably clean, and on the present arable acreage it has not been necessary to do any "couching" for several years. The worst weed encountered is the annual black grass or Slender Foxtail, while charlock has proved troublesome in spring corn and roots. Incidentally the prevalence of charlock has been one reason for concentrating on a high proportion of winter corn crops. The stubble cultivation and autumn cleaning follow no hard and fast rules. Expediency governs each operation. Thus if the stubble is very long, ploughing is resorted to and probably a cross-ploughing is given in addition. Where a long stubble is not likely to be troublesome, a Ransome Dauntless cultivator is employed and is found, because of its rigid tines, to be an excellent implement for this work. This treatment secures a satisfactory germination of weed seeds. It should be emphasised that Mr. Brown regards the maintenance of clean land as essential for the successful practise of his system. It is considered to be a waste of money to manure dirty ground. A further check on weeds is the custom of not growing more than five straw crops in succession on the same ground. Usually a change is made after four straw crops. On the average about three cultivations, at weekly intervals in dry weather, are found sufficient to move the ground and kill most of the weeds present. This treatment has even been found satisfactory in a wet autumn; if not killing the weeds it checks their growth and the deep ploughing which follows buries the weed so that most of it is rotted in the soil. The depth of ploughing advocated is 6 inches for cereals, and 9 to 10 inches for roots.

Mr. Brown is a convinced supporter of the mechanisation of arable farming. Tractors have been used by him since 1918, and his present equipment consists of two light tractors supplemented by nine horses. A certain degree of crop rotating is followed because it has been found that the land is kept cleaner if winter corn is alternated with spring cereals. The use of liberal seedings of spring oats for example has solved some of the earlier difficulties with this crop, the seed-rate employed being 6 bushels per acre.

As mentioned earlier it is not the custom to take more than four or five straw crops in succession. This allows the introduction of a root break. In recent years mangolds have been largely replaced by sugar beet, of which crop 30 acres are grown under contract. The mangold area is about 4 acres; a further 3 acres of marrow kale are grown for the needs of the dairy herd up to January, while 2 acres of thousand-headed kale

are grown for February and March feeding. Some 8 acres of market garden crops are taken, in the form of Christmas cabbage, broccoli, and savoys. The corn crop following roots acts as a nurse crop for a two or three years' seeds ley. Seeds occur on the same land about once in eight years. The best wheat crops are secured after a clean clover ley, though good results are also obtained with wheat after peas and vetches. The typical cultivations for wheat after clover ley are :—

Plough and press.

Broadcast seed at 3 bushels per acre.

Harrow 2 to 4 times according to the season.

The following spring the land is harrowed twice or thrice and is rolled when fit.

The wheat varieties grown are principally Cambridge Browick, and Victor. Browick with its stiff straw is found to stand well and yielded up to 9 qr. per acre in 1929 and 8 qr. per acre in 1930. Victor is used for the second and third straw crop following clover ley, while Yeoman II was tried in 1931 for the first time. All the old red varieties have been discarded on account of their liability to lodge. The seed wheat is always dressed with copper sulphate to prevent bunt. The manurial treatment of the wheat crop is liberal. Direct manuring is practised to all the crops, and Mr. Brown is a firm believer in the use of compound manures. It is argued that very rarely is it possible to store individual manures satisfactorily and that it is still more difficult to mix them properly on the farm. By buying in large quantities on a contract basis compound manures are secured at reasonable prices and a balanced, properly mixed and easily sowable manure is therefore available immediately it is wanted. 4 cwt. per acre of wheat fertiliser is employed, with an analysis of 2.5 per cent. nitrogen, 10.52 per cent. phosphoric acid and 2.0 per cent. potash. An extra top-dressing of 1 cwt. per acre of nitrogenous fertiliser is given if wheat follows clover or other leguminous crop, or 1½ cwt. if wheat is the second or third straw crop in succession. There is a degree of elasticity however; much depends on the appearance of the wheat crop in spring as to whether a heavy or a light top-dressing is applied. The choice of nitrogenous manures is principally between sulphate of ammonia and nitro-chalk. In general practice, the nitrogenous top-dressings are not applied until the ground can carry the manure distributor in spring, which is usually in March. Earlier application tends to make the crop "winter proud," as well as to stimulate the growth of Black Grass at the expense of the wheat.

The costs of wheat production after clover or roots are estimated by Mr. Brown as follows :—

	£	s.	d.
Rent	2	0	0
Ploughing and pressing	0	11	0
Harrowing 4 times	0	6	0
3 bushels seed @ 40s. per qr.	0	15	0
Broadcasting seed	0	1	6
4 cwt. wheat fertiliser @ £6 2s. 6d.	1	4	6
Distributing fertiliser	0	1	6
1 cwt. Nitrogen and sowing	0	6	0
Spring rolling and harrowing	0	3	0
Cutting, including string	0	15	0
Harvesting (shocking and carrying)	0	12	6
Thatching	0	5	0
Threshing with own tackle	0	10	0
Carting to station	0	5	0
	<u>£7</u>	<u>16</u>	<u>0</u>

The estimated returns are naturally dependent upon the ruling price for wheat. Wheat has rarely been so low as during the past year, and never during Mr. Brown's farming career. Here again the long view has to be taken, so that the years of depression are placed alongside the seasons of better prices. Mr. Brown claims that a 5-qr. yield per acre is now being exceeded by him, but 5 qr. at 30s. and $1\frac{1}{2}$ tons of straw at 45s. bring the receipts per acre to £10 6s. 3d. The margin of 50s. 3d. is left to cover overhead charges, interest and depreciation, &c. These present low returns are not satisfactory to Mr. Brown, but he claims to be well satisfied with the general results secured at the average prices ruling over the last seven years. Actually his average yield since 1929 has been over 5 qr. per acre. In that year, 80 acres of wheat averaged $7\frac{1}{2}$ qr. The same relative level of output is secured from the other crops grown, and equally generous manuring is given. It is of interest to note that though the soil with which Mr. Brown is working is theoretically deficient in lime, no particular benefit has been derived from applications of lime, even when the crop is sugar beet. The management of Mr. Brown's arable land is not by any means a fool-proof proposition. The higher parts of Hayling Island are only a few feet above the high tide level. The sea is kept back by means of embankments, while the drainage is not too good. The accumulated surface water is only able to get to the sea at low tide by means of sluices, the entry of the sea water being automatically prevented by means of "clappers." Deeply dug ditches provide the main drainage system on Mr. Brown's land. Care has to be exercised not to work the land when it is too wet, otherwise it runs together and bakes hard. Economies have been effected in the working of the arable fields by the avoidance of small breaks. Where necessary, previously existing small divisions have been thrown

together into larger breaks. A further illustration of the zeal for efficiency is the fact that within the last four years five large Dutch barns have been erected, mainly for corn crops. The equivalent of thirty ricks can now be put under cover, thereby saving thatching which is considered to be too expensive, while the barns are a further help in a "catchy" harvest. They are 70 feet by 30 feet, with a height to the eaves of 18 feet. They cost £200 each, the money being borrowed from the Lands Improvement Company and the Bank.

The live-stock interests of Mr. Brown are determined purely by commercial considerations. A herd of about 100 milking cows is maintained, there being a daily milk contract for 200 gallons. The cows are a mixed assortment of breeds and types. Thus Friesian, Shorthorn and Guernsey cows are kept, and are mated with a Guernsey bull. The Friesian is the type most preferred since they are found to be the heaviest yielders, but Mr. Brown has been compelled to introduce Guernsey "blood" by reason of the development of the bottled milk trade on the south coast, in which colour and quality make a first appeal. Mr. Brown has no pride in the appearance of his herd judged on a basis of uniformity of type. The cattle are good for the purpose for which they are required, as will be recognised from the herd average of about 950 gallons from full time cows for the last three years. Quality and yield of milk are closely studied, but only cheap cows are bought so as to cut down depreciation. The best cows in the herd are milked thrice daily, at 5 a.m., 2.30 p.m. and 7.30 p.m. The herd is divided between two farms. On the one, it was necessary to erect a new cowshed for 32 cows which cost £575 inclusive. On the other, an old barn was converted into a cowshed at a cost of £200. Both hand and machine milking are practised, in the latter case a Vaccar machine having been used for six years with very satisfactory results.

A herd of twelve breeding sows is kept, again without any attention to breed. They are of Saddleback and Gloucester type and are crossed with a Middle White boar. An outbreak of swine fever three years ago was responsible for a contraction of Mr. Brown's pig-breeding interests. The young pigs bred on the farm are sold as weaners.

The poultry flock consists of about 1,800 head of laying birds. Mr. Brown has endeavoured to reduce his poultry farming to a system involving the least amount of trouble. One man is in charge of this section. The birds are kept in houses which hold two hundred laying hens. Hatching has been dispensed with, since it has been found cheaper to buy twelve-weeks-old pullets from a reliable source, the contract for these being placed early in the season. The breeds preferred are White Leghorns,

their cross with the Rhode Island Red, and the Brown Leghorn Rhode Island Red cross. It is interesting that the laying hens are retained for four or five years. In other words they are kept for as long as they are healthy and look like laying. Mr. Brown disagrees with the practice of replacing stock every year, or even every other year—especially on a farm where the laying birds have unlimited room in which to roam.

The horses are of a clean-legged type. A Suffolk stallion is kept, which apart from breeding uses is put to work on the farm.

The grassland, which supports the dairy herd for the major part of the year, has been subjected, as in the case of the arable land, to a system of intensive manuring. Phosphates and potash are applied every third year. Nitrogen has been used for promoting an early bite, but the main trouble with the grassland is that it is so wet early in the season as to make early stocking almost impossible. Thus although in normal years there is a bite of grass on this land by the end of March, it is not fit to carry cattle until the end of April. Mr. Brown does not believe in the trampling of a wet turf at the beginning of the season; hence the use of nitrogenous fertilisers on the grass is a questionable practice, having regard to local circumstances.

It must be recognised that Mr. Brown's live-stock interests to some extent complicate his views in regard to the utilisation of dung. He has, however, proved to his own satisfaction that arable land of the type with which he is dealing can be successfully cropped without farmyard manure. The arable and live-stock sections of his farm are treated entirely separately, as will be judged from his practice of selling off all his cereals and feeding his dairy herd on purchased balanced compound dairy nuts. He buys over £2,000 worth of foodstuffs every year. Mr. Brown is equally emphatic that he would not attempt to cultivate on his system of arable farming what Cobbett described in his *Rural Rides*, the "rascally gravels and spewy sands." Farming with him is a business and he is not in the least interested in the policy of the plough for its own or for sentiment's sake. He has in his own practice been guided by the following beliefs:—

- (1) That good arable land can grow good crops indefinitely, given good cultivations, good management, and artificial manures.
- (2) That manuring with balanced artificials is more economic than the use of dung or sheep.
- (3) That land managed under his system increases in fertility.
- (4) That the secret of cheap production is to utilise mechanical devices to the full.

Mr. Brown does not claim any originality for many of the ideas and practices which he operates. He has had a sound

practical grounding in the essentials of farming practice and possesses the alertness of mind to appreciate any new discovery which can be exploited in his practice. In the management of the farm Mr. Brown is fortunate in having the assistance of his brother, who is equally keen. His labour requirements are met by 2 tractor drivers, 3 horsemen, 6 cowmen, 7 labourers and 1 poultryman—approximately one man to every twenty-five acres of land farmed. This is a fairly liberal allowance, but not excessive in view of the large head of stock that is maintained. Mr. Brown sees no particular virtue in increasing the labour population on the land. High Farming with him implies the maintenance of the minimum of labour necessary to do the job well.

The financial results of Mr. Brown's farming are fairly indicated by the extent to which his business has grown. He maintains, on the evidence of his private cost accounts, that corn has left him a profit even in years of low prices. It must also, however, be remembered that he has at his door an exceptional market for poultry and dairy produce and that these departments have contributed a good deal to his success.

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THE PRESENT POSITION OF THE USE OF FERTILISERS.

[Read before the British Association, Section M, September, 1930.]

A SURVEY of the present position of the agricultural use of fertilisers both in relation to its past development and its current problems is opportune at a time when both agriculture and the large chemical industry dependent on it are undergoing far-reaching changes. The present year is particularly appropriate, for it marks the centenary not only of the first considerable importation of artificial fertilisers but also of the British Association for the Advancement of Science, which has provided the occasion for many of the outstanding announcements and fruitful discussions on the scientific basis of both industries. In the early days of the British Association the agricultural aspects of a great wave of enquiry and experiment found their proper place in the Royal Agricultural Society, and an agricultural section of the British Association is a comparatively recent development. But the founders of the Association were not unmindful of the agricultural importance of their work and

of the value to pure science of the examination of agricultural problems. At its first meeting the scientific background of crop rotations was discussed, and a few years later Liebig was invited to prepare a report, which was published in 1840 under the title *Chemistry in its Application to Agriculture and Physiology*. This is rightly regarded as the most important publication in the whole history of agricultural science. At a time when farmers were assured by their advisers that the function of humus and dung was to supply carbon to their crops, Liebig showed convincingly that the carbon came from the air and that manures supplied certain inorganic salts present in most manures only in relatively small amounts.

He asserted that "a time will come when fields will be manured with a solution of glass (silicate of potash), with the ashes of burnt straw, and with salts of phosphoric acid, prepared in chemical manufactories exactly as at present medicines are given for fever and goitre." In the same year, and independently of Liebig, Lawes at Rothamsted had already carried his experiments on one of these salts to the large-scale field trial. In 1841 he used some 20 tons of superphosphate made from bones, and in the following year he took out his patent. In 1843 he issued his first advertisement, imported rock phosphate from Spain for the manufacture of superphosphate, and, with the assistance of Gilbert, laid out his first large field experiment, Broadbalk wheat, to test what appeared to him to be the fundamental weakness in Liebig's theories. Lawes' early manuring schemes were so similar to modern ones and have become so well known through the continuation of his experiments that familiarity with them is liable to lead to wrong impressions of the early stages of the industry. Although he used ammonium salts as his standard form of nitrogen, many years elapsed before the sulphate of ammonia industry became firmly established. Even in 1863, when a third of the century now being celebrated had elapsed, Liebig scoffed at the suggestion that ammonium salts would ever play an important part in agriculture. He stated his conviction that "if increased production depends upon the augmentation of nitrogenous food in the soil, we must at once renounce all idea of improvement." Using Lawes' estimate that 1 lb. of ammonium salts gave 2 lb. of wheat, he calculated that to increase the corn production of Saxony by one half would require 130,000 tons of ammonium salts annually, and added that "those who possess even a slender acquaintance with chemical manufacture and know from what raw materials (animal refuse and gas water) salts of ammonium are procured, must easily see that all the manufactories in England, France and Germany, put together, could not produce so much as the fourth part of the salts of ammonia required by comparatively a

very small country in order to increase its products in the manner proposed." The relative importance of sources of ammonia at that time is shown by the order in which Liebig puts them, and it is confirmed by other writers. The problem of converting the unpleasant gas works liquor into ammonium salts was solved soon afterwards and the rapid expansion in the production of sulphate of ammonia may be followed in the Reports of the Alkali Inspectors, where there is much praise and some moralising over the triumphant conversion of a nuisance into a source of profit. Unfortunately, history appears to be repeating itself, for sulphate of ammonia may now be produced more cheaply in other ways and the disposal of gas liquor is again a problem. As in the middle of last century, current agricultural literature contains accounts of attempts to use gas liquor directly on the land, and some gas works are once more disposing of their ammonia by sending it up the chimney or by using the gas liquor to slake coke.

By 1870 this country produced 40,000 tons of sulphate of ammonia and from that time onwards expansion was remarkably consistent. The annual output increased steadily at about 6 per cent. per annum from 1870 to 1913. The raw materials for other forms of fertiliser are more localised and data are available showing the annual output almost from the commencement. World outputs of 1,000 tons per annum were attained in the following years:—

- 1831 Nitrate of soda.
- 1848 Mineral phosphate.
- 1860 German crude potash salts.
- 1879 Basic slag.
- 1908 Synthetic nitrogen.

Although no great accuracy can be ascribed to the individual figures the data available¹ are sufficient to bring out clearly

¹ The data in Figs. 1 and 2 are taken from the following:—

(a) F. Hoeskamp's *Handbuch der Pflanzenernährung*, Part II, 1931; P. Kricheldorf, p. 54 (Basic Slag, 1925-8); G. Leimbach, p. 488 (Nitrate of Soda, 1830-1922).

(b) P. Kricheldorf, *Das Kali*, Part I, 1923, p. 134 (Potash Salts, 1861-1921).

(c) C. M. Aikman, *Manures and Manuring*, 1894, p. 341 (Nitrate of Soda, 1830-1892), p. 358 (Sulphate of Ammonia in G.B.I., 1870-1893).

(d) G. Lunge, *Coal Tar and Ammonia*, 1916, Part III, p. 1525 (Sulphate of Ammonia World, 1902-1913), p. 1520 (G.B.I., 1889-1914).

(e) A. N. Gray, *Phosphates and Superphosphates*, 1930, p. 100 (Phosphate Rock, 1847-1929).

(f) J. Hendrick, *Trans. Highland Agric. Soc.*, 5th Ser., 29, 1917, p. 22 (Basic Slag, 1880-1913).

(g) *Nitrogen Products Committee. Final Report, 1920, and Statistical Supplement, 1921.*

(h) *British Sulphate of Ammonia Federation, Ltd., Annual Reports for 1923-4 to 1929-30.*

the general trends, especially when they are shown diagrammatically. For quantities varying from 1,000 tons to over 10,000,000 tons the ordinary method of plotting is not convenient. Fig. 1 shows the figures for annual outputs from the

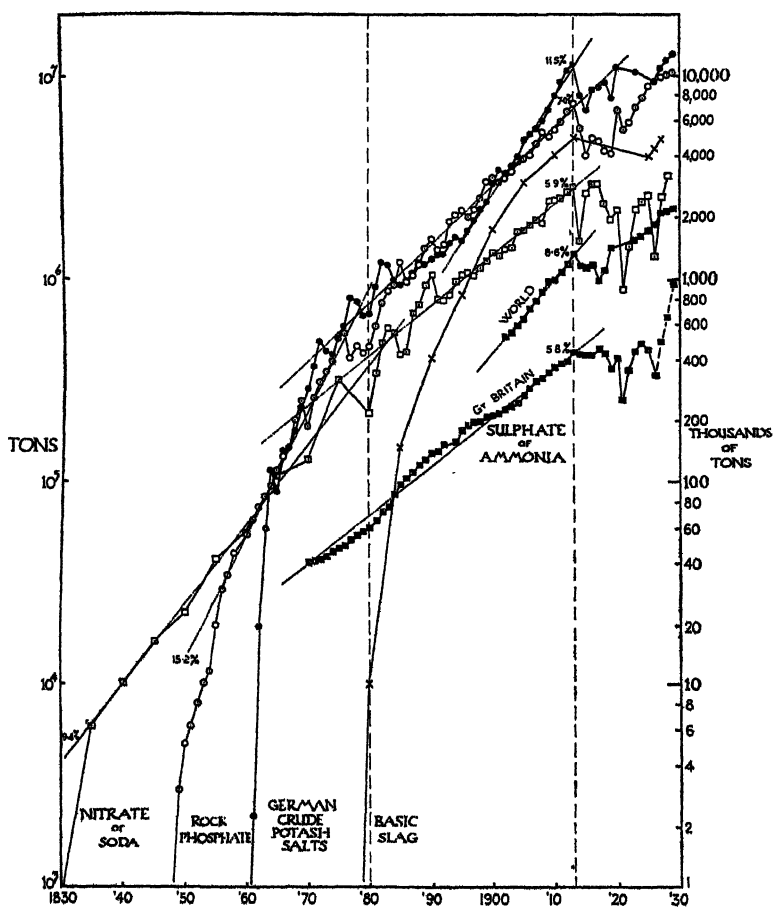


FIG. 1.

earliest available dates to the present in such a way (actually semi-logarithmic) that the relative and not the actual increases are given by the slopes of the lines. A straight line over a considerable number of years shows that throughout that period the output was increasing at constant compound interest, i.e., at a constant relative or percentage rate. Thus the line

for sulphate of ammonia production for the British Isles shows that an annual increase of about 6 per cent. was maintained for over a third of century. All of the fertilisers, with the exception of basic slag, show similar periods of constant percentage increase in output at rates which are summarised in the following table :

Percentage Increase per Annum in Total World Output.

Nitrate of Soda (Chile)	1835-1880	9.4	1880-1913	5.9
Sulphate of Ammonia (Great Britain).	—	—	1870-1913	5.8
Sulphate of Ammonia (World)	-1902	?	1902-1913	8.6
Mineral Phosphate	1853-1875	15.2	1875-1913	7.0
German Crude Potash Salts	1867-1874	23.0	—	—
	1874-1895	4.3	1895-1913	11.5

All of the curves show a break with rather violent fluctuations at the time of the agricultural crisis of the late seventies and again, of course, in 1914, but between these two periods the relative rates of expansion are surprisingly constant for rock phosphate, Chile nitrate, and ammonium sulphate. The production of crude potash salts developed but slowly from 1875 to 1895 and very rapidly from then onwards. In the periods of more or less constant relative increases in output before the war it will be noted that ammonium sulphate was expanding more rapidly than Chile nitrate and that potash was expanding much more rapidly than rock phosphate.

The whole fertiliser position has, of course, been profoundly modified by the phenomenally rapid expansion of the synthetic nitrogen industry during the war and again since 1923. The following table compares the output in 1913 and in the year ending June 30, 1930 :

	Thousands of Tons of Nitrogen.		Percentage of Total.	
	1913.	1930.	1913.	1930.
Synthetic other than Calcium Cyanamide (mainly direct ammonia synthesis in 1930)	25	1,008	3	46
Calcium Cyanamide	60	284	7	12
By-product Ammonia	353	462	42	20
Chile Nitrate of Soda	400	464	48	21
Total	<u>838</u>	<u>2,178</u>	<u>100</u>	<u>100</u>

Direct ammonia synthesis has outstripped its competitors and now produces almost half of the world's total fertiliser nitrogen; calcium cyanamide has increased less rapidly but still provides one-eighth of the total; the early arc process for nitrates has fallen behind and yields only a small fraction of the total. Fig. 2 shows that annual world output since 1900

in terms of tons of nitrogen, plotted in the same form as in Fig. 1. The relative rates of increase were :—

Chile Nitrate	.	.	1902-13	6.5	per cent.	per annum.
By-product Ammonia	.	.	1902-13	9	"	"
Synthetic Nitrogen	.	.	1912-18	52	"	"
"	"	"	1918-23	4.3	"	"
"	"	"	1923-30	23	"	"
Total " Nitrogen "	.	.	1902-13	8.1	"	"

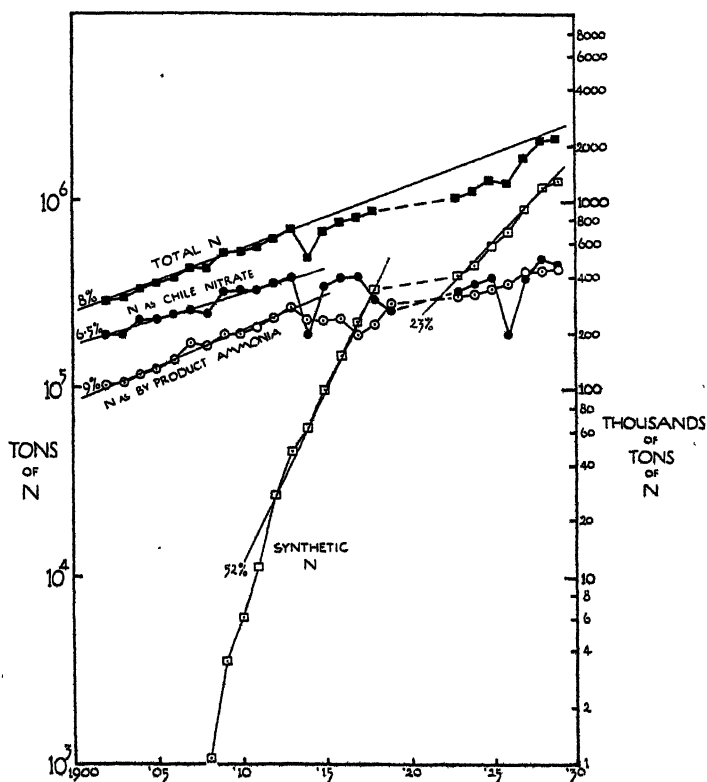


FIG. 2.

In spite of irregularities and crises during and since the war the smoothness of the curves before 1913 have probably some significance for an understanding of the present position. The relative expansion then remained constant for fairly long periods in spite of fluctuations in general trade and market conditions. Had these rates continued unchecked until the present time the total consumption of nitrogen would have been about the same as that actually attained in 1929. In Fig. 2 the points

for actual total production caught up in 1929 with straight line projected on from the pre-war days. Again, it happens that Chile nitrate supplied much more nitrogen than by-product sulphate of ammonia before the war, but the latter was catching up quite steadily. If the pre-war rates had continued unchecked by-product ammonia would have caught up with Chile nitrate in total nitrogen production by about the present time and this has in fact happened in spite of the violent fluctuations in both curves for actual production.

"Over production" and "potential world consumption" are much abused and overworked terms, generally without any physical meaning, but for fertilisers they would acquire some fairly precise significance if the constancy of the percentage rates of increase before the war can be correctly interpreted. It is suggested that they represent the result, not of a blind interplay of purely commercial factors, but of a progressive attainment and diffusion of information on the behaviour of fertilisers acquired by experiment and experience. Straight lines in the method of plotting adopted here represent the simplest type of growth in biological systems, and it is suggested that in Figs. 1 and 2 the straight lines represent essentially the steady growth of a body of knowledge. Whatever may be the views of farmers, salesmen and economists on the relative importance of market conditions and research in determining the development of agricultural practice, there can be no doubt that the large fertiliser syndicates fully appreciate the ultimate dependence of their output on research and education on the behaviour of fertilisers. Almost without exception they have established large agricultural research stations on a broad and fundamental basis. That of Imperial Chemical Industries at Jealott's Hill is one of the newest but its work is already well known. The writer has visited similar stations in Germany concerned respectively with synthetic ammonia, calcium cyanamide, superphosphate, potash salts, and basic slag. Nearly thirty years ago the German potash syndicate realised the importance of assembling and distributing in semi-technical form the results of research work, not only on potash, but on the broader aspects of plant nutrition, and more recently other organisations have followed this example. In Germany there are now no less than three independent semi-technical journals on phosphates, one of them being trilingual.

Some of the effects of the rapid expansion in the fixed nitrogen industry are already obvious. The price of nitrogenous fertilisers fell steadily from about 1923 and most drastically in 1931, whereas the prices of phosphates and potash have remained much more nearly constant and above pre-war levels. The relative costs of the three major nutrients are quite different

from those of pre-war days. More important, however, is the introduction of new forms of highly concentrated fertilisers based on ammonium phosphate. Such products will ultimately reduce transport and distribution costs and lead to a standardisation and simplification of the fertiliser mixtures offered to farmers. If, as seems likely, their production expands considerably, it will react on the whole method of propaganda and selling of fertilisers. The large syndicates will handle all forms of plant food and will realise that the expansion of their trade depends on the efficient use of all of them. The farmer will not need to learn his fertiliser chemistry in terms of the personality of rival salesmen or propagandists. Demonstrations of fertilisers at shows will not be distributed confusingly among seeds, cattle foods, and medicines as at the Royal Show, but will be shown impressively in a coherent whole as in the German Agricultural Show, where the many forms of synthetic nitrogen, phosphate, potash and lime are demonstrated together in a single imposing pavilion.

In the early days of the industry mixed fertilisers contained a large proportion of superphosphate, and in 1863 Liebig wrote that "though many manufacturers of manure add a certain quantity of ammonia to their production, this is chiefly to humour the fancy of farmers for this substance." The "prejudice" in favour of nitrogen did not disappear as he expected, but steadily spread, and it still continues to do so in most of the older countries. The proportions in which the three principal nutrients are used vary widely from country to country; those for 1928 are shown in Fig. 3 in the form of a triangular diagram.¹ The world average was approximately 1 N : 2 P₂O₅ : 1 K₂O. Great Britain, France, U.S.A., and Denmark used rather more phosphate; Holland, Poland, Sweden and Norway used more potash, and Germany used very much more potash and much less phosphate. Italy, Algeria, South Africa, New Zealand and Australia used chiefly phosphate; Egypt and Formosa chiefly nitrogen. In Fig. 4 the changes from 1913 to 1928 in the average practice are given in a similar method of plotting. Most European countries moved in the direction of a lower proportion of phosphate, but the change in the world average was less marked on account of the increased consumption of phosphate in the countries using little else. Since 1928 there has been a further increase in the proportion of nitrogen.

In the old mixed fertilisers there was little standardisation of the proportions, but with the newer products standardisation is easy. It is interesting to note that the German and the

¹ The data in Figs. 3, 4, 6 and 7 are from P. Kricheldorf in *Honcamp's Handbuch*, II, 1931, p. 45, and P. E. Howard, *U.S. Dept. Agric. Circ.*, 129, 1931.

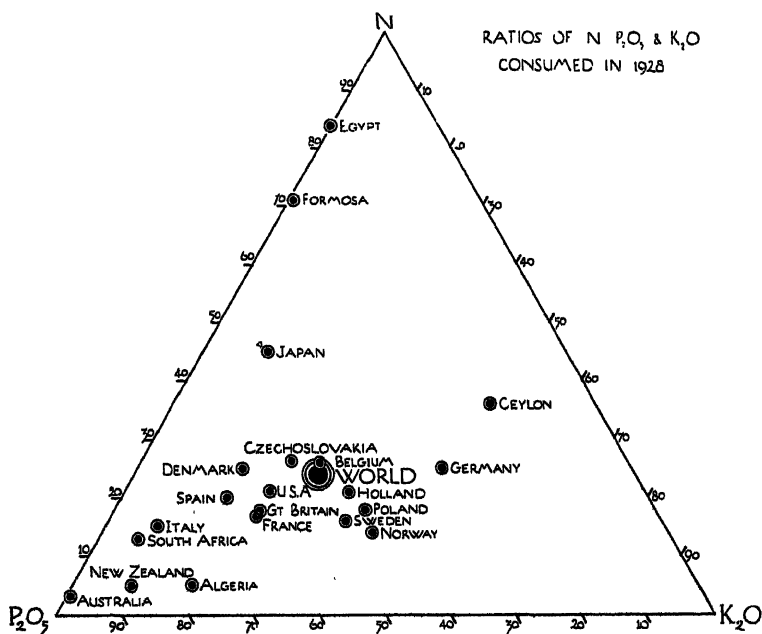


FIG. 3.

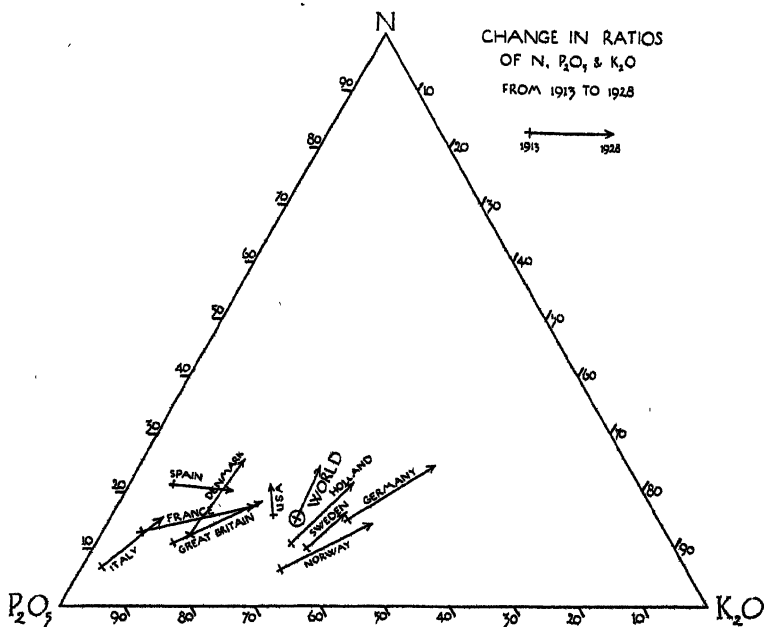


FIG. 4.

British synthetic nitrogen organisations have chosen quite different ranges of products. The I. G. Farbenindustrie A.G. puts out various "Nitrophoska" materials based on diammonium phosphate, potassium chloride and ammonium nitrate or sulphate, all relatively rich in nitrogen and potassium. Imperial Chemical Industries, Ltd., uses monoammonium phosphate, ammonium sulphate and potassium chloride, with rock phosphate in some mixtures, to produce a much wider choice of ratios, covering in fact most of those common in the older mixtures. These newer products are compared in Fig. 5 with

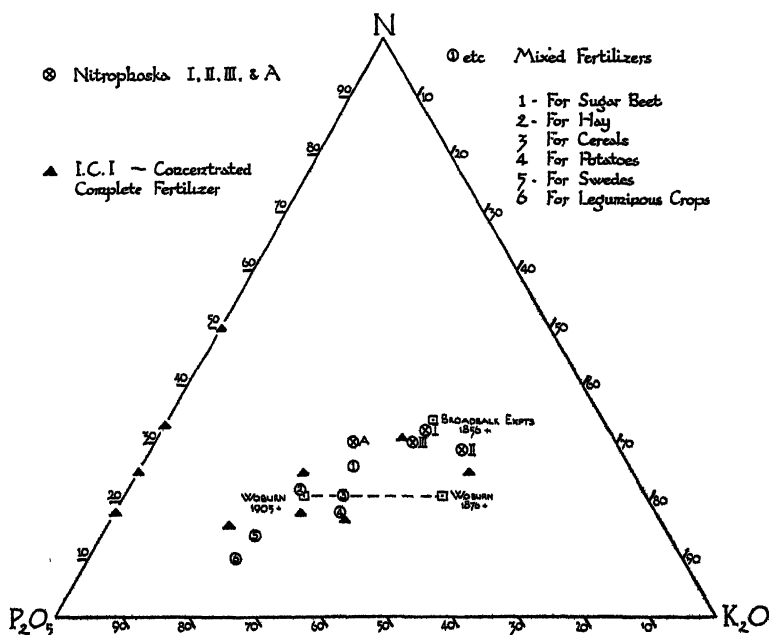


FIG. 5.

typical examples of the older mixed fertilisers selected from a Ministry of Agriculture pamphlet.¹ The diagram also includes one of the earliest and in some ways the most famous fertiliser mixture, *viz.*, the standard dressing adopted by Lawes in 1858 in the Broadbalk wheat experiments. The ratio of $N : P_2O_5 : K_2O$ is almost the same as in the most modern products. At Woburn a somewhat similar mixture was used for the first thirty years.

¹ Ministry of Agriculture Pamphlets. Sectional Volume No. 8, on "Fertilisers and Manures," p. 59.

RATES OF FERTILISER CONSUMPTION

"Over production" is so often asserted that it is well to remember that the average rate of fertiliser consumption is still very low, even in countries of relatively highly developed agriculture. In the British Isles the average annual consumption per acre of agricultural land (i.e., area "under crops and grass" in *Agricultural Statistics*) is of the order of $\frac{2}{3}$ cwt., or about 3 lb. N, 7 lb. P_2O_5 , 3 lb. K_2O . We stand, of course, in a special position in that relatively large amounts of plant food reach our farms in imported feeding stuffs for stock. The nitrogen in imported cereals is about four times as much, and that in imported feeding cakes and seeds nearly as much as that in the total amount of sulphate of ammonia and nitrate of soda used in British agriculture. The precise fraction of this nitrogen which reaches our farms is difficult to estimate, and that which reaches the soil and the growing plant is still more uncertain, but there can be little doubt that our farmers buy more nitrogen in feeding stuffs than in fertilisers. In any case, probably more than nine-tenths of the nitrogen in our crops come either from the soil or from the air and not from fertilisers, and the permanent grass and longer temporary leys now being put down will store up more nitrogen ready for liberation either in happier days when it becomes profitable to mobilise it once more or in still unhappier ones, as in 1917 and 1918, when it may be necessary to do so at all costs.

High rates of fertiliser consumption are required only for intensive systems of cropping with rapidly growing crops or with systems of farming which waste soil nitrogen. Frequent cropping with cereals is particularly wasteful of nitrogen in a humid country, for it provides abundant opportunity for the oxidation of organic matter and production of soluble nitrogen at times when the crop is small and losses in drainage are high.

With lower rainfalls or with colder winters the wastage is less and cereal production can continue for long periods without fertilisers, though sooner or later some returns must be made either through Lawes' manures or Liebig's restorative crops. The association of high fertiliser rates with certain specialised systems of farming is well illustrated by the 20 cwt. per acre dressings, not unusual for potatoes in South Lincolnshire or for market garden crops in the Penzance district. On a wider scale it is seen in the maps of Western Europe and U.S.A. in Figs. 6 and 7.¹

¹ The areas used in the calculations for the European countries in Fig. 6 are based on those given by the International Institute of Agriculture, Rome. Fertiliser rates are given in kilograms per hectare of nitrogen, phosphoric acid and potash (1 kg. per ha. equals 0.89 lb. per

FERTILIZER CONSUMPTION IN 1928

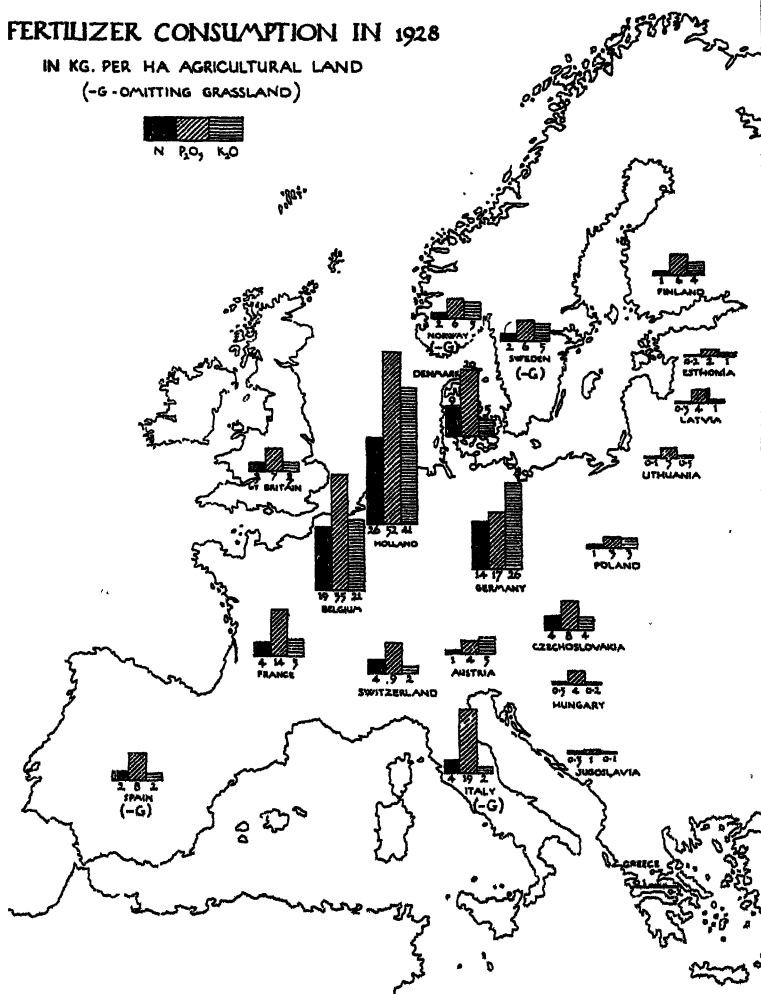
IN KG. PER HA AGRICULTURAL LAND
(-G- OMITTING GRASSLAND)

FIG. 6.

Holland, Belgium, Germany and Denmark use large amounts ; Norway, Sweden, the British Isles, France, Spain and Italy use less ; and the countries of Eastern Europe use very little indeed.

acre). In the map of the United States the total fertiliser consumption is given in lb. per acre of land under 47 kinds of crops. In certain countries marked (- G) grasslands are omitted.

The map also illustrates the differences in the ratios of the primary nutrients already discussed.

It would appear that the proximity to supplies is a more powerful factor than the climatic or soil conditions in determining the proportions of fertilisers used. In the U.S.A. fertilisers are used at heavy rates in the truck crop districts of the Atlantic coastal strip and the extreme south and also in the cotton belt; the dairying, corn and winter wheat belts use small amounts comparable with those of this country; but fertilisers have scarcely penetrated beyond the Mississippi to the spring corn and hard wheat belts. In U.S.S.R. it is realised that continuous wheat-growing in the newer semi-arid areas

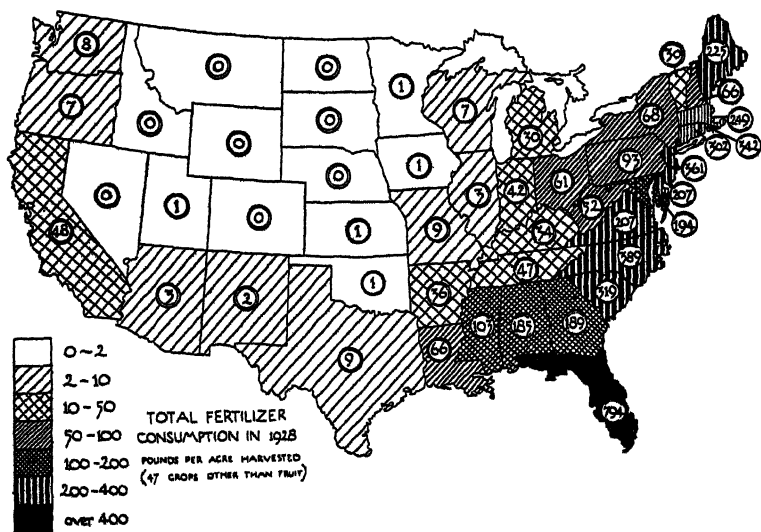


FIG. 7.

of the North Caucasus and elsewhere is only an interim measure, and a chain of experiment stations is actively engaged in discovering whether "It pays to fertilise" or to grow soya beans instead.

Up to the present, Liebig's view that nitrogen was relatively unimportant for wheat production has proved truer for the world as a whole than the diametrically opposite view put forward by Crookes in 1898, when he concluded that nitrogenous fertilisers were so important in wheat production that their impending shortage might imperil the future of the wheat-consuming races. At the present time the bulk of the world's wheat receives no nitrogenous fertiliser, though there are signs

in the wheat belt of U.S.A. that nitrogen deficiencies sometimes occur.

THE EFFECT OF FERTILISERS ON CROP YIELDS.

At the present time there is a greater need than ever for accurate information about the actual effectiveness of fertilisers under different conditions of agriculture. The demonstration that a given fertiliser will increase the yield has value only under novel conditions, as in new countries or with new crops, or for education of the most elementary type. Modern conditions demand careful comparisons of the return for a given amount of fertiliser with its cost, or of two similar mixtures likely to give similar returns. If agricultural practice is to be based on sound information instead of guess-work on the production as well as on the economic side, the accuracy of our experimental findings must be greatly increased. Even with the best designs a modern field experiment must have many plots to establish beyond reasonable doubt a 10 per cent. effect on yield, and for many practical problems still greater accuracy is wanted. The only possible remedies are :—

- (1) to have a large number of well-designed but not necessarily elaborate experiments carefully conducted at representative centres over a period of years, and to draw conclusions from the general average
- and (2) to have elaborate experiments at a few restricted centres.

Some instances of each of these methods of attack will be considered.

(1) *Multiple Experiments on Commercial Farms.*

Co-ordinated schemes of field experiments on fertilisers have made but little progress in this country. Comparative trials on varieties have been more successful because they are easier and their purpose is more obvious; the old varieties wear out and there is always the chance that some new one fresh from the Plant Breeding Station or seedsman may prove to be "just the thing" for a given farm. Half a century ago fertiliser trials made a similar appeal to the gambling instinct of the more enterprising farmer who was prepared to experiment, but now fertilisers are so well known and standardised that the results are rarely spectacular. Vast numbers of experiments, or demonstrations as they are often more modestly called nowadays, are made annually by Agricultural Institutions, County Staffs, commercial organisations and farmers, but they are not generally co-ordinated, and the results are rarely published. The Rothamsted Library has "Guides to the Field Experiments" for many counties and other bodies, with

but few Reports on their Results. It does not appear to have been realised that simple experiments become useful only if taken together in sufficient numbers; they can have little value as individuals. Even in simple experiments on commercial farms a moderate degree of replication is essential, but with the newer methods and equipment the necessary harvesting, threshing and weighing can be carried out with little disturbance to normal farm operations and at no exorbitant cost.

In the meantime one must look abroad to obtain instances of such experiments and to get reliable data for the average effects of different fertilisers over a wide range of farms. The German Experiment Rings provide a good example of multiple field experiments, and have the additional interest that in most of them the experiments are arranged and the costs are borne by the farmers themselves. One of the earliest and most successful set of experiment rings is in East Prussia, where in 1924-28 some 5,000 replicated fertiliser experiments were conducted to measure the responses to each of nitrogen, phosphatic acid and potash. Some of the results are given in Tables I and II, together with those from a set of nearly 3,000 official Danish experiments in Zealand and Jutland over a longer interval of time.¹

To facilitate the comparison of different crops on a uniform basis the mean results have been reduced to a common basis in terms of dry matter by assuming the average composition of the produce.

Table I gives the extra dry matter per unit of nitrogen added as fertiliser for a number of crops in these three series of experiments, together with some estimates by Sir John Russell from his experience of British practice. The cereals show with striking consistency that 1 part of nitrogen under normal practical conditions in these countries gives about 13 parts of dry matter as grain and about 24 parts as straw. In other units, the 1 cwt. of ammonium sulphate or its equivalent gives about 3 cwt. of grain and rather less than 6 cwt. of straw. With roots the results are more variable. The average effects of phosphoric acid and potash are much smaller than those of nitrogen (Table II).

The data illustrate, too, the important fact that fertilisers alter not merely the size of a crop, but also its form and com-

¹ *Danish Experiments* :—

Jutland. H. P. Martekilde, *Beretning om Planteavlssarbejdet i de samvirkende jydskke Husmandsforeninger*, 1929, p. 171 (Aarhus, 1930).

Zealand. L. Rasmussen, *Beretning om Landboforeningernes Virksomhed for Planteavl paa Sjælland*, 1930, p. 315 (Copenhagen, 1931).

East Prussian Experiments :—

L. Heller, *Betriebeerfolg und Düngewirtschaft. Arbeiten der Landwirtschaftskammer für die Provinz Ostpreussen*, No. 60, 1929, p. 94.

TABLE I.
Increased Dry Matter in Crop per 1 Part of Nitrogen.

No. of Experiments	East Prussia. 4,268	Jutland. 1,366	Zealand. 1,978	Rothamsted Report, 1929. —
Wheat Grain . . .	11	—	13	10
Rye „ . . .	13	14	13	—
Barley „ . . .	13	13	13	13
Oats „ . . .	15	12	13	11
<hr/>				
Mean 12.8				
<hr/>				
Wheat Straw . . .	—	—	29	21
Rye „ . . .	—	30	20	—
Barley „ . . .	—	22	22	26
Oats „ . . .	—	23	22	25
<hr/>				
Mean 23.9				
<hr/>				
Potatoes	17	29	—	22
Swedes	16	22	18	11
Mangolds		25	32	20
<hr/>				
Mean 21.2				

TABLE II.
Summary of Experiments in East Prussia (E P) and Denmark (D).

<i>Increased Dry Matter in Crop per 1 Part of</i>			
	Nitrogen.	Phosphoric Acid.	Potash.
Cereal grain (EP + D)	13	3.5	1.2
Cereal straw (D)	24	4.1	2.4
Roots (EP + D)	21	6.0	4.0
Ratio of extra grain to extra straw (D)	1.0	1.2	2.1

Percentage Recovery of Added Nutrients.

(Assuming average composition for crops.)

	N.	P ₂ O ₅ .	K ₂ O.
Cereal grain + straw (D)	39	5	4
Roots (EP + D)	36	4	14

position. Both nitrogen and potash gave about twice as great an increase in straw as in grain, but the effect of phosphoric acid was most marked on the grain; it gave only 1.2 parts of extra straw per part of extra grain.

The recoveries of added nutrient, calculated by assuming that the crops, both manured and unmanured, had the same composition as average English crops, show high values for nitrogen and very low ones for phosphoric acid; the recovery of potash was very low for cereals and moderate for roots.

A comparison of the East Prussian and the Danish results brings out an interesting discrepancy between practice and the results of experiments. As would be expected from the similarity in geological and climatic conditions, there is little difference between the relative magnitude of the effects of nitrogen and potash on crops in the two countries, but East Prussia uses about five times as much potash as Denmark per unit of nitrogen consumed. In part this may be ascribed to the greater proportion of potatoes and sugar beet grown, but it also suggests that political and commercial factors are more important than purely agronomic ones.

TABLE III.

Comparison of Utilisation of Fertilisers in East Prussia and Denmark.

Relative Effects of Fertilisers.

	N.	P ₂ O ₅ .	K ₂ O.
<i>On Cereal Grain.</i>			
East Prussia . . .	1.0	0.26	0.10
Denmark . . .	1.0	0.28	0.09
<i>On Roots.</i>			
East Prussia . . .	1.0	0.35	0.18
Denmark . . .	1.0	0.26	0.19
<i>Relative Amounts of Fertilisers used.</i>			
East Prussia . . .	1.0	1.8	3.0
Denmark . . .	1.0	2.4	0.6

The examination of current practice by systematic experiment generally brings surprises. In East Prussia the results were grouped to show the influence of the preceding crop on the response to fertilisers in the experimental crop. As was expected, cereals generally exhausted the land, and the responses to nitrogen were relatively high in the following crops; after second-year clover the responses were relatively low. But wheat after first-year clover and wheat or barley after various leguminous plants, such as peas and vetches, gave good responses to nitrogen, contrary to all expectations. These results resemble the famous paradox of the Woburn green manure experiments in which wheat gave poorer results after tares than after mustard. They may be explained in the same way by an excessively rapid oxidation following the incorporation of highly nitrogenous residues with the soil at a time when leaching is high and the soil either bare or carrying a very small crop, though other factors, such as too deep ploughing of the leguminous stubbles, may also be involved. This indirect method of studying the nutritional aspects of crop rotation has especial value, since direct experiments on different rotations are particularly difficult to carry out.

Apart from their value in giving useful general averages, such co-ordinated experiments become still more valuable when attempts are made to examine in detail the results at individual centres, though here again there is little chance of progress unless sufficiently large numbers are available to smooth out accidental effects and the results of unusual systems of management. One of the most promising lines of investigation is to attempt to relate the response to fertilisers to the results of soil analysis. Since the growth of experiment rings German laboratory work on the estimation of nutrient requirements of soils has developed enormously, and now occupies the greater part of the scientific journals devoted to soils, fertilisers and crops. The field trials revealed numerous examples of acute phosphate deficiencies and some even of potash deficiency, and thus directly stimulated work on methods for detecting such soils or estimating their fertiliser requirements by soil analysis. Mitscherlich's pot culture method, Weissman's modification of it, Neubauer's seedling method, the citric acid method, the azotobacter test, the water soluble phosphoric acid, and several other methods, are all being tested, criticised and developed, since each University and Research Institute can obtain field data in its own district, and the challenge of unexplained results has to be met. The field experiments may not be accurate enough for critical studies, and they, too, must be improved; and so the cycle from laboratory to the farm and back to the laboratory goes on with a steady improvement in both theory and practice.

A second method of relating the results of field trials to the soil conditions, and so making them of service to other farmers, is through the soil survey method, which has proved so successful in parts of the United States and on which such great hopes are being built in U.S.S.R. at the present time. The soil surveyor can identify and map similar soils over wide areas, but the farmer and his technical advisers can make little use of the map in improving fertiliser practice unless the results of past experience are recorded in some unambiguous and objective manner.

The laboratory worker is sometimes criticised because he does not put his findings into terms that the practical man can understand, but he might justly reply that the farmer rarely troubles to put his experience into a form that the research worker can use. In some ways the most disappointing situation is in connection with liming. It would probably not be an exaggeration to say that the number of reasonably good methods proposed for estimating the "lime requirement of soils" is greater than the number of even moderately good field trials on different amounts of lime made in this country. The necessary experiments cannot be carried out on Experimental and College Farms, for few of them have suitable soil. The problem

of securing efficient co-operation between farmer, adviser, and research worker is not yet solved.

(2) *Field Trials at Experimental Stations.*

The justification for experiment stations is that they should be able to carry out experiments which cannot be conducted on commercial farms, and it would be wasteful of effort if they limited themselves to purely practical experiments of immediate and local interest.

Long-continued experiments of the Rothamsted type are needed not only to follow the cumulative effects of changes too small to measure in normal practice, but to secure a consistent body of data over many years suitable for the statistical examination of seasonal effects. In the earliest continuous experiments the conditions became abnormal not only through the use of continuous cropping instead of ordinary rotations, but by the progressive decline in fertility on many of the plots. Some new series are therefore required, and two have recently been laid down at Rothamsted and one of them repeated at Woburn.¹ The first is devoted to the problem of assessing the residual value of manures over a period of five years. Dung and Adco are compared on the basis of equal organic matter and equal N, P_2O_5 , and K_2O with a third treatment of straw equal in amount to that used in making Adco, with additions to give the same total nutrients. The experiment also includes a comparison of superphosphate and mineral phosphate. Each course of the rotation—potatoes, barley, seeds, wheat—occurs every year, but the manures are repeated after 5 years, so that in 20 years each plot will have received its manure at each stage in the rotation, and the mean residual values found for a given period after application will give true measures of the progressive exhaustion.

The other new experiment at Rothamsted and Woburn is to measure the extent to which the responses to nitrogen, phosphoric acid and potash for each of the crops in a six-course rotation vary from season to season. In the course of 15 years each plot will pass through the treatments 4, 3, 2, 1, 0 units of N with $2P_2O_5$ and $2K_2O$; 4, 3, 2, 1, 0 units of P_2O_5 with 2N and $2K_2O$; and 4, 3, 2, 1, 0 units of K_2O with 2N and $2P_2O_5$; and each stage in this cycle will be represented each year. All of the plots will thus receive the same total amounts of nutrients in 15 years and will remain at a moderate level of fertility comparable with practice. The average effect of nitrogen, phosphoric acid and potash will be found each year.

In addition to these permanent experiments, complex short-

¹ For full details of these new continuous rotation experiments, see *Rothamsted Report for 1930*, p. 125.

term experiments are required not merely to compare fertilisers, but to study how fertilisers should be used by comparing their behaviours under different conditions.

Too often in our field trials it is assumed that the best conditions are known, and all that remains is to ascertain which is the more profitable of two essentially similar treatments, but it must often happen that the conditions could be improved so that one or both of the fertilisers would give much better results. R. A. Fisher, who has been responsible for so much of the recent progress in field experiments, has said, "Nature will best respond to a logical and carefully thought-out questionnaire—indeed,

COTTON YIELDS IN FOUR-FACTOR EXPERIMENT, SUDAN GEZIRA, 1929-30.

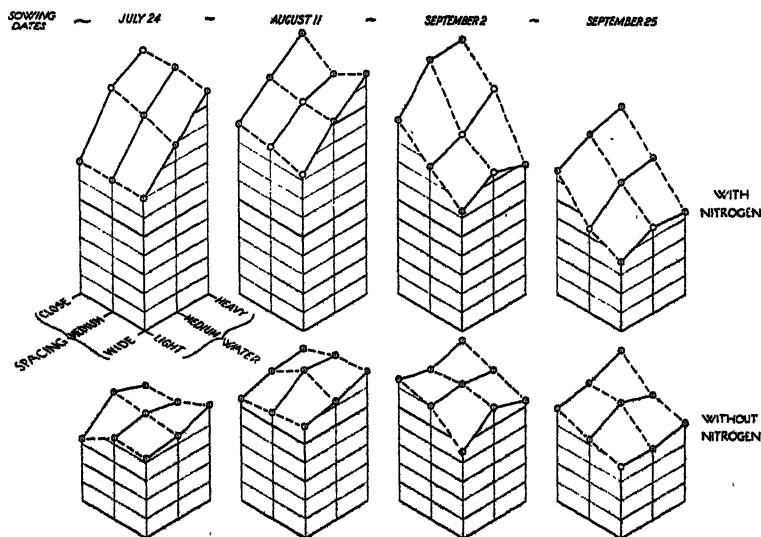


FIG. 8.

if we ask her a single question, she will often refuse to answer until some other topic has been discussed." The modern method of approaching fertiliser and other agronomical questions can be well illustrated by recent progress in field experiments on cotton under irrigation at the Gezira Research Farm in the Sudan. Until a few years ago it was customary there to ask questions one at a time and to have a systematic series of separate experiments on such questions as time of sowing, water duty, amount of fertiliser, time of applying fertiliser, spacing of cotton, and so on, in the hope of discovering the optimum condition for each factor separately, and then combining the best treat-

ments. There were some striking results and not a few disappointments. In 1929-30, F. G. Gregory, F. Crowther and A. R. Lambert¹ carried out a four-factor experiment in which all of the 72 combinations of the treatments,

- 4 sowing dates,
- 3 spacings,
- 3 rates of watering,
- with and without ammonium sulphate,

were tested simultaneously in a single experiment.

Their data are plotted in Fig. 8 to show the results in final yield of cotton for all 72 treatments. The heights represent the yields plotted as solid models against the 9 combinations of 3 spacings and 3 waterings for series with and without nitrogen, at each of the 4 sowing dates. In the absence of nitrogen the various cultural treatments had but small effects, and separate experiments on the isolated questions would have shown little beyond an optimum sowing date. The addition of nitrogen not only increased the yield by as much as 100 per cent. in some cases, but also raised the fertility of the soil sufficiently to bring out the effects of the other factors tested. When nitrogen was added the amount of water proved to be the important factor in early sown cotton and the closeness of spacing in the late sown cotton; neither nitrogen nor extra water could make up for too wide spacing in late sown cotton. The experiment directs attention to some of the most important factors in cotton cultivation and points to obvious improvements in practice. It also suggests why nitrogenous fertilisers had given disappointing results in earlier trials under commercial conditions where cotton was often unavoidably sown late and widely spaced. Such an experiment is obviously much more efficient in yielding information of immediately practical value than a vast number of simple trials carried out under what might often prove to be unsuitable conditions.

When the optimum conditions for the use of fertilisers are known from direct experiments over a wide range of conditions, practical tests on commercial fields may be undertaken with much greater confidence and success.

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¹ F. G. Gregory, F. Crowther and A. R. Lambert, *Empire Cotton Growing Corporation Conference on Cotton Growing Problems*, 1930, 112.

CHALK LAND FARMING IN HAMPSHIRE.

THE chalk area in Hampshire is part of the main belt of that portion of the cretaceous system which stretches from Yorkshire and Lincolnshire, Norfolk and Suffolk on the East Coast of England, through parts of Cambridge, Buckingham, Hertfordshire, Berkshire, Hampshire, Wiltshire, Dorset, and East Devon, with two arms which extend eastwards through Sussex and Kent, and Surrey and Kent, and form respectively the South and North Downs in the latter counties. This belt constitutes one of the chief arable districts of England. Its farming has possibly undergone, during the past half century, greater change than that of most areas, and is of particular interest at the present day.

Roughly half the area of Hampshire overlies the chalk; the chalk land extends to approximately half a million acres, and is by far the most abundantly represented of the geological formations. The area is roughly rectangular in shape, varying from 20 to 25 miles North and South and from 30 to 37 miles East and West. To the West it continues into Wiltshire as Salisbury Plain; to the North-West it carries on into Berkshire and forms the main uplands or Down part of that county, and at the South-West it extends into Dorset. It is bordered along the greater portion of the North and South by the newer geological deposits of the Reading Beds and London Clay; to the East there has been erosion, so that the older formations of Upper Greensand, followed by Gault and Lower Greensand, are exposed to the surface successively.

Disregarding local exceptions, the chalk rectangle may be considered as having been pushed up from underneath, thus forming an anticline. The strata dip to the North and South under deposits which were laid down later. The chalk thus forms a block of upland country.

The *Lower Chalk* borders the Upper Greensand, varies from 150 to 200 feet in thickness and forms the lower part of the escarpment of the North Downs to the east of the county in a strip varying from a few hundred yards to two miles broad. Small isolated patches are found at Chilcombe, close to Winchester, at Linkenholt in the North-East corner, and at Sydmonton and Burgholere, in all cases on relatively low ground or in dry valleys running into the hills. The total area in the county is limited. The Lower Chalk is characterised by the absence of flints.

The *Middle Chalk* contains only a few flints and is usually comparatively hard. It is particularly suitable for conversion into lime, and a number of quarries and kilns have been set up on it. It is roughly the same thickness as the Lower Chalk,

and is found adjoining it in small areas or strips in the parts of the county already mentioned.

The *Upper Chalk* covers the great part of the chalk area, and is for this reason the most important of the three sections. As a whole, the chalk rock is soft, pure white and consists almost entirely of calcium carbonate, but has a number of thin layers of flint running through it. The soils overlying it will be considered in further detail later. Though they vary in thickness and texture to some extent, they are all characterised by the presence of sharp angular flints. The Upper Chalk varies in thickness from 600 to at least 1,000 feet.

Chiefly on the higher parts of the North-West, East, and South-East of the rectangle, and covering considerable portions of the Upper Chalk (particularly on the flat tops of hills) is a deposit of clay and flints, which varies from a few inches to 3 or 4 feet in depth, with pillars extending into the chalk to a depth of as much as 20 or 30 feet. The origin of this deposit is uncertain, but it is probably derived from newer formations; it is easily identified by the large rounded flints and the red sticky nature of the soil.

The general nature of the country in the chalk rectangle of Hampshire is similar to that in adjoining counties, and is probably too well known to need description. The clay hill tops are often covered by woods of oak and ash with an undergrowth of hazel, which has been cut at regular intervals and used in making wattle hurdles. Beech woods are common where there is less depth of soil, but in the main the country is open and bare. The highest areas are in the North-West corner, to the East and South-East, where Butser Hill reaches a height of 889 feet above sea-level, and forms the western extremity of the long line of the South Downs. The lowest points in the area are over 200 feet above the sea. The bulk of the area lies between 400 and 700 feet and consists of upland country in the form of a series of rounded rolling hills, though the slopes of the higher hills are steep and the escarpment of the North Downs is sudden and dramatic. The chief rivers are the Itchen and the Test, with its tributaries the Anton and the Bourne, all of which are typical clean chalk rivers with areas devoted to the growth of watercress. A minor river is the Meon, while the River Wey rises in the East of the district and runs into Surrey. As compared to Dorset, there are fewer valleys, and their sides are less steep. In comparison with both Dorset and Wiltshire there is, on the majority of the farms, a smaller proportion of actual downland.

The farms are large as a rule, as also are the fields, which may run to as much as 200 acres; and there is a comparative absence of hedges, as might be expected of a district where

the chief live stock in the past have been sheep kept in hurdles. Recently, as in other districts, barbed-wire fences have become a common feature.

The farm-houses and buildings are in most cases situated at the lowest point. The latter consisted in the past largely of stables and of the characteristic brick and wood barns, with outlying sets of buildings of a similar nature at higher points on the larger farms. The difficulty of obtaining water has probably governed the position of the buildings, since it may be necessary, at higher points, to sink wells to a depth of over 300 feet before a constant supply is obtained. There are certain areas which even to-day are entirely dependent on rainwater, and where water has to be hauled for several miles in periods of drought. Dew ponds are found in some places. The houses and cottages are frequently constructed of flint or of puddled chalk. Alterations in buildings have been principally for their conversion into cowsheds and yards for the wintering of cattle, while a certain number of Dutch barns have been put up in recent years.

The average annual rainfall may be taken at rather over 30 inches, though the records of the past 11 years at Sparsholt show variation from 16.90 inches in 1921 to 46.65 inches in 1927.

Various attempts have been made to classify the soils overlying the chalk into definite groups, but the variations and characteristics are difficult to define. It is by no means easy to forecast the natural capabilities or fertility of these soils even after field and laboratory examination, and consideration of all the known factors involved. The reddish clay-and-flints is comparatively distinct and produces a sticky, somewhat intractable soil, which if ploughed wet readily "bakes" into large clods, but which is capable of producing heavy crops if well manured. A good deal of this soil is naturally sour and definitely responds, both from a texture and fertility standpoint, to dressings of chalk or lime. Mechanical analysis shows a large "fine silt" fraction, but a surprisingly low amount of "clay." Another surprising feature is its low content of available potash.

On the greater part of the upland Downs and on the sides of the hills there is only a thin layer of soil, varying from 3 to 6 inches in depth. This contains many flints, and is poor hungry soil, naturally deficient in phosphate, potash and humus. Since percolation is rapid, a further limiting factor in plant growth is lack of water. Much of this area has been under grass for an indefinite period of time and carries the characteristic short Down turf, the thinnest portions becoming overrun with dwarf thorn and bramble bushes. The bulk of the remainder has

been laid down, or has fallen down, to grass during the past half-century, because corn or sheep prices made it unremunerative to keep under the plough. This forms what is known as the "bake" land, the fertility of which was maintained in the old days by the growth of successive "green" crops which were folded off by sheep. At the lower levels of the chalk, and mostly in the valleys, are found deep loams of a fertile nature, where the chalk is at least 3 or 4 feet below the surface. Such soils are the best found in the chalk area, responsive to manuring, though naturally deficient in phosphate and potash and frequently also in lime; on the whole they work easily except for a tendency to "run together" when wet, and are still largely under arable cultivation. Between the thin upland type of soil and the valley loam may be found a whole series of intermediate types which vary in depth, texture, and natural fertility.

Three other types of soil occur in small areas in valleys overlying the Lower Chalk—firstly, a sticky marly type, light in colour and containing ample lime, which can, however, only be cultivated when dry; secondly, a poor gravelly type where an alluvial deposit of valley gravel has been superimposed on the chalk, and in which the stones are water-worn and rounded; thirdly, in what are now, or what have been in the past, water meadows, are soils that are dark in colour through the accumulation of humus, and which, in practically all cases, by virtue of their position adjacent to rivers and streams, are wet and under grass. The water meadows which have been maintained, and which can be irrigated at will, provide good spring and summer grazing, and are particularly valuable in shortening the period of winter feeding of cattle, and also during periods of drought; in most cases the herbage is stated to be of second-rate quality, but a large bulk is produced. In recent years the cost of labour in cleaning out and making good the ditches both for "feeding" and "draining" water, together with that of repairing hatches, has in many cases become prohibitive; in such cases the land has reverted to wet meadows and produces a coarse growth that is available only during a short period of the year.

In considering characteristics which are common to all chalk soils probably one of the most interesting, and to many people surprising, is the general lack of lime. Throughout the chalk area, and on the majority of fields, can be seen the rounded depressions or shallow pits from which chalk was dug and spread over the land at regular intervals and in dressings of 20 to 50 tons per acre. Increasing labour costs in the past 50 years have stopped this practice, but it seems probable that to-day crops are being grown on the large reserves of lime thus built up in the past. Cases of partial crop failure through sourness

of soil are increasing in number, and though this applies in particular to the "clay-and-flints" soil already referred to, it is even found on thin soils where the chalk is only a few inches underneath. On the latter type of soil, it may be mentioned, attempts have been made to get over the difficulty by gradually increasing the depth of ploughing, and so bringing chalky material to the surface. According, however, to tradition, this partially weathered chalk-rubble which lies above the solid rock not only brings to the surface an ample supply of weed seeds such as charlock, but actually renders the soil infertile and reduces crop growth for a period of anything up to 6 years. The practice of liming or chalking, whichever may be found the cheaper, is therefore being re-introduced to some extent, and it would appear probable that it will be required to a gradually increasing extent in the future.

With the exception of the red clays and deep loams in the valleys the chief limiting factor in plant growth is water, and this fact has exerted the greatest influence on farming practice in the district. Percolation through these soils is naturally free and rapid, the water table is at a considerable depth, there is generally only a small amount of humus present, and lastly the open nature of the country and the lack of shelter increase the rate of evaporation of soil moisture.

Traditional farming practice has therefore been shaped towards the conservation of soil water; and this undoubtedly caused as great an intensification of cropping for, and folding by, sheep as anywhere in England, and made sheep the centre of the system. In this way, not only were large quantities of organic matter returned to the soil, through the feeding of successive crop as well as hay and concentrated food on the land, but records show that straw was frequently spread on the folds and trodden in by ewes following younger sheep over the root crop. The value of the "golden hoof" of the sheep for consolidation of the soil has always been appreciated, though the point is sometimes questioned to-day. Some attempt is being made at the present time by means of experiments in the area, to measure the effect of sheep folding on successive corn crops.

The use of the furrow press and of frequent rolling with heavy ring rollers has always been a part of local practice. The necessity of maintaining a surface mulch (in the case of root crops by hoeing and in corn crops by harrowing) so as to reduce evaporation has likewise been realised, together with the advisability of keeping the ground covered by growing crops in the dry summer months.

Again, when such land is laid down to grass, the limiting factor of lack of water is clearly shown. Yet it is characteristic

of such pasture that, though growth is normally slow during the summer, there is sufficient capillarity to prevent actual "burning" in time of drought and to maintain a green colour long after grass has become brown on the gravel soils of the district.

Soil analysis shows that on most chalk soils the amount both of available phosphates and potash is below crop requirements. Though superphosphate has been regularly used for years, on the root break in the rotation, it is probable that the greater use of potassic fertilisers is advisable. Experiments in recent years have indicated that the application of complete fertilisers produces the most economic results on arable crops. In the case of grassland phosphates and potash together, with nitrogen for increasing the bulk of hay or accelerating spring growth, are best employed. Trials have also shown that slow acting phosphatic fertilisers, if finely ground and applied at the right time of year, produce good results.

Two problems of manuring, which are difficult to solve except for individual fields, or farms, are the amount of fertiliser to use in order to get the best financial return; and under what conditions, and in what length of time, land which has reached a low level of fertility may be raised to normal by the use of artificial manures alone, or when it is necessary either to resort to sheep folding or the addition of organic matter in some other form.

Interesting evidence has been obtained on the first problem in experiments at the Farm Institute, Sparsholt, during the past 5 years, on different parts of one field which is a good deep loam and where the cultivation has been thorough. A light dressing of dung has been applied to all plots, and in addition dressings of 6, 8, 10 and 12 cwt. respectively of an artificial mixture consisting of 1 part sulphate of ammonia, 2 parts superphosphate, and 1 part sulphate of potash. An average of results shows that the 8-cwt. artificial dressing is the heaviest that can be economically used, that one of 12 cwt. definitely depresses the yield, and that the seasonal results show singularly little variation. The chief exception occurred in the wet season of 1931, when the heavier dressings produced a further increase of crop.

The evidence on the second problem is, as perhaps might be expected, most conflicting, but it is apparent that if the production of the area is in the present crisis to be materially raised by an increase of arable cultivation, this is the primary question to be solved. There is no doubt that the difficulty of distinguishing nutritional and cultivation problems confuses the issue. There is evidence that on many chalk soils cases of poor crops which have been attributed to lack of available plant

food, are in fact due to the limited range of soil open to root development through a pressure plough-pan. The breaking of this pan by means of sub-soiling or the use of a deep, heavy cultivator, without bringing the sub-soil to the surface, has produced extraordinary results in the way of increased crop growth.

Another characteristic of chalk soil is the natural abundance of weeds, and in particular of charlock.

In attempting to describe the farming of the district, the easiest plan is probably to consider briefly first the farming of 60 to 70 years ago, the peak time of the development of the sheep-and-corn system, and then to analyse some of the changes brought about by economic pressure since that date.

To take the simplest case, many of the farms consisted of narrow rectangles, containing a proportion of valley, side land and hill. The lower fields surrounding the buildings were under grass used chiefly for the small number of cattle kept and for store sheep in summer. Where there was a stream these were irrigated as water meadows. Next came the heavier arable land in the valleys which received dung, and was cropped with corn, particularly wheat, sometimes beans, and whatever roots were required to be carted off for the winter feeding of housed stock. The centre of the farm, which would vary in depth and character from a medium loam to typical, thin "bake" land, was then, as now, worked on various rotational systems, but the general basis was the succession of two "green" crops, for folding, by two corn crops.

The so-called Wiltshire eight-course rotation was employed in Hampshire, and may be summarised as follows :

- 1st Year. Catch crop of rye, winter barley, trifolium or vetches, followed by swedes, turnips or rape.
- 2nd Year. Swedes, spring vetches, kale, rape, or mangolds.
- 3rd Year. Wheat.
- 4th Year. Barley or oats.
- 5th Year. Seeds out for hay and then folded.
- 6th Year. Seeds folded, followed by rape, turnips or swedes.
- 7th Year. Wheat.
- 8th Year. Barley.

Under this system half the arable land was under green crops for sheep feed, and half under cereals ; but it was varied according to the state of fertility and depth of soil, so that as much as two-thirds of the land might be under crops for stock and one-third for cereals, or *vice versa*. The permutations and combinations were infinite, but speaking broadly the main benefits claimed for such a rotation were : (1) that a heavy sheep stock could be carried in order to maintain the condition of the

land ; (2) that the growing of a second root crop allowed ample time to fold off the first, and for the sheep to be fed until grass was available ; (3) that the preparation for wheat was thorough, and the land left in a high state of fertility ; (4) that a better and more even sample of barley was obtained when it followed a straw crop rather than roots.

A proportion of the seeds entry was sown to sainfoin which was left down for from 4 to 6 years, and used partly for hay and partly for folding. An average of one-eighth of the arable acreage might be under this crop.

The top portion of the farm, where the soil was thinnest, would be left as Down or "sheep walk" and used as summer grazing or as exercise-ground in periods of wet winter weather.

The proportion of arable land probably averaged 75 per cent. of the whole, and the stock of sheep varied between 1 and 1½ ewes for every acre under the plough. The sheep were practically confined to what were known as the improved Hampshire Down ; ewes were regularly drafted after their third crop of lambs, and the bulk of the wether lambs was sent to the well-known summer and autumn Sheep Fairs for fattening in other districts.

The merits of such a farming system lay in the large total output considering the type of land involved, in the high level of fertility that was maintained on the poorest soil, and in the heavy yields of corn that were produced. From records of the times, however, it seems clear that the heavy expense involved in growing a succession of crops for sheep, in pitching hurdles, carting water, and management generally, was not repaid by the prices realised for the wool, store lambs, and draft ewes. As long, however, as the price of cereals was remunerative, the system was a sound one, because the residual benefit of the folding more than paid for any loss on the sheep themselves.

Before passing on, the point already made should be emphasised that in Hampshire there is less both of river valley and of untouched downland than in adjoining counties. Though a farm containing both has been taken as an example, there are large districts where the farms do not contain the same distinct types of land, and where the best land is not so generally fertile, nor the poorest land quite so thin, as in the case which has just been considered. Further, the tops of the hills are frequently covered with clay-and-flint soil which was kept under the plough. Finally the proportion of arable was frequently greater than the figure quoted, and the cost of maintaining sheep proportionately higher.

From the late seventies and early eighties of last century till the present day, there has been an almost continuous decline in the intensiveness of farming in the area, in conformity with

the fall in corn, and often also in sheep, prices. In the years preceding the war, it is true, slightly improved prices and improved methods enabled the movement to be stopped, and of course exceptional conditions during, and immediately after, the war brought about an increase in the acreage under corn. The point should, however, be made clear that increased production during the war was often achieved at the expense of the reserves in the soil, and not as a result of "balanced farming," and that the position, when the slump in prices came in 1921, was aggravated by this fact.

The annual returns published by the Ministry of Agriculture show that, during the last 50 years, the arable acreage in Hampshire has decreased by more than a third, that the sheep population is roughly a quarter of what it was, but that the number of cattle has doubled in the same time. These statistics do not tell the whole story, as there is every reason to believe that the changes on the chalk area alone have been more marked than those for the county as a whole.

In so far as suitable land has been properly laid down to grass, and sheep replaced by dairy cattle to supply the increased demand for milk, the change has not only been dictated by the law of supply and demand, but has been justified by changed conditions. Over much of the area, however, the grass policy has been forced upon the farmer by his straitened circumstances. He has been obliged to reduce expenditure without reference to the question whether the change would or would not be "truly" economic, and without the capital necessary to give the new system a reasonable prospect of success. In fact, whatever may be the merits of recent or projected changes in farming policy in the district (which will be considered briefly later on), the real crux of the whole problem is the provision of fresh capital to enable such changes to be undertaken.

Even in a cursory survey or journey through the north of the county the obvious conclusion must be drawn that there are to-day large tracts of country in a low state of productivity, carrying poor grass that is insufficiently stocked. Much of the worst is even reverting to scrub and rabbit-warren. And similarly, large areas still under cultivation are producing crops of an order which cannot pay even for the reduced labour and small quantity of manure that is being expended on them. The selling off of sheep stock in order to obtain necessary cash, and the attempt to maintain land under the plough without the substitution of other means of fertilisation have been the main causes of the present impoverished condition of the arable ground. To deplore a lowering in the level of production through a change from an intensive to an extensive system may be illogical, if the land is naturally suited to a ranching system,

and can pay under it; but it seems questionable whether this can be truly said of the area under consideration.

It is difficult to give a concise picture of a typical farm of to-day, as so many different methods and forms of stock have been tried in the attempt to meet present conditions. It will therefore probably be best to consider each branch of farming separately. During the past half-century there has been a good deal of immigration of farmers both from the North and West of England who have been attracted by cheap land in Hampshire. These form groups in different parts of the county, and have introduced the methods and the kinds of stock to which they were accustomed in their former home areas. Stock farming, with which they have been more familiar than the native arable farmer, has been the basis of their various systems.

So far as orthodox dairy-farming is concerned, new byres have been built, or the existing barns and other ranges of buildings have been adapted to house milking. Little difficulty has been found in extending the area of grass close to the buildings, as this has usually consisted of the better land. The supply of water has, however, often been either difficult or expensive.

The type of grassland produced, the relatively dry nature of the soil and the prevailing climatic conditions have made for successful dairy farming, and the raising of healthy stock. The regular cash income from milk has enabled many farmers to keep going here as in other parts of the country. It is, however, in the further extension of grass upon the larger farms that the difficulties have arisen, and a large proportion of the outlying acreage has in many cases remained unremunerative. By the use of modern seeds mixtures of the "Cockle Park" type, containing a limited number of grasses and clovers chosen to suit the conditions, and with the use of heavy initial dressings of phosphatic and potassic fertilisers, it has been shown repeatedly that even the thinner soils can carry second-class pasture. Cocksfoot and perennial ryegrass form the grass basis of the seeds mixtures, the former because of its certainty in growth, earliness, and ability to stand hard grazing. The merits of Perennial Ryegrass are too well known to need enumeration, but unfortunately it will not always "stand," and it is probable that the partial substitution of Meadow Fescue for it may be more regularly practised in the future. Wild White Clover, particularly in recent years since the price of seed has been more reasonable, trefoil and the larger clovers for bulk in the initial year are, as elsewhere, the chief legumes. The employment of the quickly establishing grazing mixtures and the use of indigenous strains of seeds promise good results.

Such pasture is of very fair quality, with a good clover "sole," but growth is never luxuriant and only very light cuts

of hay can be harvested after the second year. There is no reason to believe that such pasture cannot be maintained, by regular manuring and mixed stocking, at a fair level of productiveness. The use of long leys, and hence the maintenance of rotational grass, has, however, much to recommend it. Increased yields of hay or keep can be obtained, and the accumulated reserves of humus and plant food (which are not utilised by the pasture owing to other limiting factors such as lack of water) are capable of producing cheap corn crops. The old view that the establishment of good pasture was an uncertain, expensive and lengthy proceeding is being questioned to an increasing extent by practical opinion in the light of modern methods. The return to be obtained from a proper system of manuring is generally appreciated though often, for lack of money, it cannot be secured.

The cost of providing a water supply for stock, the lack of buildings, the fencing of fields, and the necessity for the sub-division of existing enclosures have been problems infinitely more difficult to overcome than the actual establishment of grass turf. The facilities provided in recent years for State aid have enabled water supplies to be provided on many farms, but the cost is frequently prohibitive, even if the money is available. Though new buildings have been rare, old yards have been improved and made suitable for winter shelter. Barb-wire fences have grown up, at a cost of about £30 to £40 per mile, and serve to keep the stock in, but they do not provide much-needed shelter. The sub-division of large fields, which is necessary if the grazing is to be fully utilised, entails heavy expenditure, and has consequently not been carried as far as is desirable. An even greater disadvantage of large enclosures is that if the herbage is left untouched it rapidly becomes rough and deteriorates. This fact, together with the frequent stocking of new pastures with sheep alone, has caused more worn-out grassland than anything else, and has led to considerable misunderstanding as to the possibility of maintaining pasture in the district.

The use of either horse or tractor sweeps has become general as the cheapest method of carrying hay in an area particularly suited to their use, and galvanised iron is replacing thatch for haystacks.

The ordinary dairy herds are managed on normal lines and do not call for any particular remark. On some farms the cows remain out night and day, and it is claimed that in this way the incidence of disease is reduced, while labour is saved in cleaning and dung carting. The Dairy Shorthorn is the principal breed, though there are increasing numbers of Channel Island cattle kept in deference to the popular demand for their

milk. The practice of maintaining herds by the purchase of heifers is carried out by many farmers, and home rearing is probably no longer the rule.

The great development of movable bails of the Hosier type, which has taken place in the adjoining county of Wiltshire, has been carried into Hampshire to a lesser extent. The advantages of this system are the reduction of both direct and indirect labour, the benefit to the land, particularly in establishing pasture on naturally poor and impoverished soil, and the fact that it does not require money to be sunk in building. Much has been written on this subject in the last decade, and it is unnecessary to reiterate what is already well known. It must be emphasised, however, that the system provides a cash-producing activity on that portion of the farm which is unsuitable for ordinary dairying, and would otherwise be devoted to arable cultivation or some other form of stock farming where the turnover of money is much slower. The treading of the cattle on the thin soils, combined with the deposition of cake-fed urine and dung direct on to the land, produces a result very similar to that of the folding of sheep. The improvement of new pastures under this system is in many cases remarkable, and such as is attainable with artificial manures only after a long period of time.

The production of down-calving or milking heifers has been taken up on some farms, where there is no cowshed, as an alternative to milk production. In most cases young calves are bought at local or more distant markets. The chalk area is suited to the growing of healthy young stock, and so long as the demand for milk remains satisfactory, there is reason to suppose that this business may gradually develop.

Cattle fattening and the maintenance of herds of beef animals is restricted to a few isolated cases, and recent prices have not encouraged any greater development. It has been shown that cows, of a type such as the Aberdeen Angus-Shorthorn cross, can be maintained outside and that good stores can be produced cheaply if some supplementary food and shelter can be provided during the first winter.

The position in regard to sheep is difficult to describe, as there is a multiplicity of breeds and crosses kept under systems of management which vary from the most intensive to practically the most extensive. There is little definite information as to the relative values of the different breeds and crosses, and investigations such as those which have been carried out by the Wiltshire County Council for the past three years in an area of similar country must therefore be watched with considerable interest.

The Hampshire Down is still the most numerous of all

the breeds. The management of the pedigree ram-breeding flocks has been modified only slightly during the past 30 years, and may be regarded as the most highly organised and complex system designed to produce the quickest and earliest growth of lamb. The thatched field lambing pens are a characteristic feature in the early part of the year. The numbers of registered Hampshire Downs have fallen rapidly, but the demand for rams both for export and for crossing purposes is still an active one, and there is probably no better breed for early lamb. The type or conformation of the breed has altered gradually to keep pace with the demand for smaller joints, and a "kinder," more compact sheep has been developed. The position has been complicated by the requirements of certain other districts for a bolder type of ram better able to imprint his characteristic in cross breeding.

There would appear to be little doubt that, unless the number of lambs can be increased by double lamb cropping and by mating the tugs at an earlier age, the cost of intensive folding cannot be justified by the returns, except indeed where an enhanced price is obtained for pedigree stock, or a specialist market can be developed for sucking lamb.

For commercial flocks of the breed greater use has recently been made of clover and sainfoin aftermath, and the series of catchcrops grown for spring and summer use has, with a view to economy, been materially reduced. It is questionable whether, in the past, the special characteristics of breeds have not been overstressed; many breeds are widely adaptable, and contain within themselves quite considerable variety of types.

There are a few South Down and Suffolk flocks in the area, but for the most part replacement of the Hampshires, where it has occurred, has been by smaller and more thrifty grass sheep of various breeds and crosses. Flocks of Ryeland, Kerry Hill, Exmoor and Cheviot sheep may be found, either pure or kept for crossing with "Down" rams. Apart from the Hampshires, however, the commonest sheep is the "Half Bred," the numbers of which have increased to a large extent since the War. The prolificacy and good milking qualities of the half-bred ewe, as well as her hardiness and grazing abilities, have been the determining factors in her favour, and but for the high cost in late years of flock maintenance in comparison with the selling price of lambs, the numbers would no doubt have increased to an even greater extent than has been the case.

Following the laying down of arable land to grass, there have been instances of overstocking of pastures by sheep, with consequent parasitic attacks, and the trouble has been frequently aggravated by the deterioration of new pastures as a result of the too close and too constant sheep stocking.

The recent heavy fall in sheep prices has made it questionable whether it can be profitable to produce lambs or mutton for a limited period of the year only, even by the cheapest methods of ranching on the lowest priced land available. Finally, it is certain that the present state of affairs, whereby an almost unlimited number of breeds, crosses and mongrels are produced within a small area, must call for further investigation and information on many points where our knowledge is at present fragmentary.

It was natural that in modifying arable cropping, attention should be given to any crop that would bring in a quick cash return, but unfortunately the district is ill adapted to any such crops. The greater part of the chalk area in question is not immediately adjacent to consuming centres, and this prevents straw being sold at the enhanced price which is obtainable in certain other districts. Hence corn growing must be considered almost entirely from the point of view of the market value of the grain. For a similar reason the growth of green market-garden crops on a field scale has only limited possibilities in the area, apart from the fact that lack of shelter and the characteristics of its soils render it unsuitable for such development. Sugar-beet growing might have developed to a greater extent had there been greater unanimity on the question, and had the demand for a factory within a reasonable distance been pressed at an earlier date than was the case. At present prices, and with existing carriage rates to the nearest factory, beet is hardly worth considering and very little is now grown. Thus the possibilities of a "cash" crop, which has recently been the mainstay of much arable land in the Eastern counties, have not been realised in Hampshire. It has indeed been shown that fair yields can be expected on the chalk if liberal treatment is given, but the roots are almost always "fangy," a circumstance which not only reduces the net yield, but makes lifting and cleaning much more difficult. The splitting of the roots appears to be due largely to the mechanical interference of flints in the soil, and not to any lack of depth or thoroughness of cultivation. Further deterrents to sugar-beet growing have been the lack of good farm roads and the long distance of many farms from a station, both making the haulage of the crop expensive.

Potatoes are grown to some extent on the majority of farms, but the yields have not been large enough to justify the extension of the acreage, or the employment of extra labour in addition to that normally carried on the farms.

In regard to forage crops, sainfoin is continuing to show itself an economic crop both for sheep grazing and on account of the high price obtainable for the hay; much trouble has been caused by inferior stocks of seed in which the short-lived

Giant Sainfoin has become mixed. The value of a reliable strain of Hampshire Common Sainfoin has been amply demonstrated, and is now appreciated.

The acreage under lucerne is small, but is gradually increasing. Were it not for its extreme uncertainty the area under this crop would be considerably greater, as it has been experimented with, on a small scale, on many farms. It is undoubtedly easier to get and maintain a plant where the rainfall is lower than that of the Hampshire uplands. Yet by inoculating, by using what are now known to be the most suitable strains, by sowing on absolutely clean ground, by the preparatory use of dung or the initial application of a complete artificial mixture, and by topping the crop before it makes too much top growth in the late summer of its sowing, followed by drastic harrowing in late winter, the incidence of failure is being reduced. There is still much to learn about the successful growth of lucerne, and experiments are proceeding on various farms in the county.

Crops for sheep folding have been modified with the object of reducing labour costs, and particularly those of hoeing. Mixtures of quickly growing plants which are suitable for broadcasting, and which will smother weeds, have been employed to a greater extent. In the case of turnips and kale for drilling, some or all of the handwork has often been replaced by cross harrowing, though the crop is neither so heavy nor so clean under this treatment. Successive sowings of mixed vetches and cereals are popular both because they provide sheep-keep over a considerable period, and may also be made into hay or stack silage as an additional source of winter fodder. Marrow-stem kale and rape, either alone or in a mixture, are used increasingly, and alternating blocks of drills of swedes and kale still form the staple winter folding crop.

In regard to cereal growing the methods of certain pioneers in the district are being watched with great interest, particularly as they are only too glad that the results of their work should be made available for the benefit of the farming community as a whole. It seems clear from the evidence of the past two years that the field costs of corn growing can be materially reduced by "mechanised" methods. Modern tractors are reliable and are capable of being managed successfully by intelligent men with little engineering knowledge. Chalk soils are sufficiently well drained to allow of all cultivation by tractors—at any rate chain track types—without either spoiling the tilth or causing "panning." Field work can obviously be accelerated by their use, and confined within shorter and more favourable periods. Finally in regard to cultivation there is nothing at present to show that the multiple disc plough is

unsuited to the prevailing conditions, or that the land becomes dirty when it is used. Corn has been successfully and cheaply harvested in the past two wet seasons by means of the "combine" harvester and the crop dryer.

From the data available it would seem that two mechanised units, each of one man, one tractor, and the necessary implements, can carry out the cultivation and harvesting (with extra help for carrying and drying of grain and collection of straw) of 500 acres of ploughed land, of which half or two-thirds is under corn, and the remainder fallowed. The capital cost of the field implements is stated to be about £5 per acre. The chief problem of equipment for this system is in the crop-dryer, with its necessary complement of storage bins for corn. However economically this is provided, the capital expenditure must be considerable and will probably only be justified on larger farms. It is clear that provision should be made for drying on a co-operative basis at convenient central points.

In considering a change-over so drastic as that entailed by what is known as "mechanised farming" it is natural that many misconceptions have arisen. Probably the chief one is with regard to the practicability and economy of tractors for all field operations apart from carting. There is no doubt that tractors have in the past been mainly supplementary to horses, and with horse implements which are neither suited to them nor built to stand the increased speed, depreciation has been heavy, and full use has not been made of the power unit employed. For a fair appreciation of the situation, a complete and separate set of equipment must be compared with the horse, and the implements evolved for the horse.

A large proportion of the fields in the district are of a size and shape suited to mechanised operations (*i.e.*, of 30 acres or over) and the extensive and costly grubbing of hedges or removal of fences would not, as is often suggested, be necessary. Finally there is no reason why this type of farming cannot be effectively combined with any of the recognised forms of stock farming that may be suitable. It may even be desirable under certain conditions to apply mechanisation only as far as the cultivation of crops is concerned, and to continue harvesting and threshing by the established methods.

By far the greatest problem, so far as the system of specialised cereal growing is concerned, is that of the maintenance of fertility. On this point the evidence, both of experiments and of practical experience, is conflicting. This point would seem to be the decisive one in ruling future policy if corn prices should be stabilised for a period of years at a more remunerative level, if it be granted that the change over to power farming is sound from a mechanical standpoint, and if credit can be obtained for

the purchase of fresh equipment. It is known definitely that under the old system of sheep folding good crops of cereals were grown; it is also known that in certain cases, under a rotation of two corn crops followed by a fallow, satisfactory yields have been obtained when a moderate complete dressing of artificials has been applied to each crop; but this has not always been the case. What is not known is where, and under what conditions, artificial manures alone can be depended upon, or whether they may be made completely effective when combined with the addition of humus, secured either by ploughing in green crops, or by seeding down the land to clover for a period.

As mentioned before, much of the area has become impoverished and there appear to be no known criteria, apart from the obvious one of depth, for assessing the natural capabilities of the soils overlying the chalk, which vary enormously in this regard.

The new movement for complete mechanisation has been outlined, but it should be noted that ploughing and cultivating have been carried out on the larger farms with steam cable tackle for many years, that, in the past decade, the number of tractors has steadily increased, and that much of the horse ploughing has been done with double furrow ploughs.

With the persistent fall in corn prices in recent years and the retention of a greater proportion of home-grown corn for stock feeding, the sowing of dredge corn, and of mixtures of peas, oats and barley has increased.

An account of the Hampshire chalk district and its farming would not be complete without mention of certain other forms of stock. It is rightly regarded as one of the best partridge areas, and the shooting has been an important consideration not only for its cash value, but also because it has exerted an appreciable influence in maintaining land under the plough. The extension of the grass area, and the reduced attention given to hedges have resulted in a very large increase in the number of rabbits, and though these may bring in a larger revenue than might otherwise be obtainable from the worst land, there is no doubt that the damage done by them is often greater than is realised. Any attempt at improvement of pasture is useless where they are found in large numbers.

As might be expected in any area of cheap and dry land, poultry farming has developed rapidly in recent years, and is now an important industry. Egg production is still the principal undertaking, but table chicken are also being produced in increasing numbers. The development of poultry has been undertaken by general farmers as well as by specialists.

The effect of the stimulus to pig breeding in the years

immediately following the War has long since disappeared and there are now few large herds in the area, though a few sows are maintained, on orthodox lines, upon most farms.

In conclusion it may be said of the chalk area that 50 years ago it was highly and uniformly farmed under a complex arable-and-sheep system which, from the point of view of producing the most from the land, was peculiarly suited to it. This system became impossible when prices failed, though it may be added that there are striking examples of exceptional men who until the last two or three years continued to farm successfully, with only slight modifications of the old plan. Dairying has provided farmers with a cash product of considerable value at a sheltered price, and in very many instances the dairy has carried the remainder of the farm. The holdings, however, are large and it cannot be said that any one general line of development has been discovered which enables the bulk of the area on the average farm to be utilised in a remunerative way. There is now little uniformity, apart from an increased area of grass, and a general lowering of fertility. The production of pigs and poultry, and to a lesser extent of dairy cattle kept on ordinary lines, may be increased to a very large extent in the future but will utilise only a small proportion of the land. It is because of this fact, and because of the circumstances of the present time, that considerable stress has been laid in this article on the two recently introduced systems; these can make use of large areas of light land, and both economise labour by the increased use of machinery. The milking bail has already proved successful in certain cases, and if cereal prices improve, mechanised corn growing would seem to provide a cheap method of production to which this area is particularly suited, and which is already being taken up in isolated cases here and there.

The only other projected development which opens up possibilities for the chalk belt is the growth and drying of green crops for stock feeding, but there is as yet no information as to its possibilities in England.

Finally it may be repeated that the lack of working capital has dictated farming policy and the present state of affairs. Without an infusion of confidence and fresh supplies of capital it will be impossible to carry out such developments as have here been briefly discussed.

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THE STRAWBERRY INDUSTRY OF SOUTH HAMPSHIRE.

GENERAL.

THE commercial cultivation of strawberries in South Hampshire dates back to about 50 years ago, when some few men started to grow, on quite small plots, strawberries for sale in Southampton and Portsmouth. For a few years little progress was made, but by 1900 the district had attained some importance as a centre of strawberry production. From this time until the outbreak of the Great War the industry was at its best, heavy yields and high financial returns being obtained. Great advantages were reaped by such villages as Swanwick, Botley, Bursledon, Netley, Titchfield, Warsash and Wickham. The estimated area at that time was about 4,000 acres, cultivated mainly by growers of from 2 to 4 acres, though there were a few men with 30 acres or more, and many with less than an acre.

During the War period the total acreage was much reduced, but this again increased rapidly between 1919 and 1923. Though there has been another considerable reduction during the last few years, the total area at present is about 3,000 acres, worked almost entirely by small growers with an average of 4 acres each. During recent years there has been a tendency to try the crop outside the original district and groups of growers are to be found near Romsey, Lymington, Alton and Petersfield.

Much of the land brought under strawberries in the early years was waste common-land or copse, generally gravelly, in many cases inclined to water-logging, but often rich in humus. Such land was cleared, drained if necessary, and produced heavy crops of strawberries for some years, cheap town dung being freely used to keep up its fertility. Some of this land is still growing excellent crops, though much of it has gone out of cultivation during the last few years. A good deal of average agricultural land, generally on the light side, is under strawberries, and by liberal manuring and good tillage has produced heavy crops. In the early days strawberry land was worth about £30 per acre, but its market value had risen to £70 to £80 by 1914 and during the "boom" period of 1919-22 it sold readily at £100 to £150 per acre. Since then prices have again declined and good land can be bought for £70 to £80 per acre.

SOILS.

Most of the soil is either gravelly or sandy loam, though in some places slightly on the heavy side. A relatively high water table is general, and when the land is sufficiently drained

to prevent water-logging in winter, such conditions are suitable for the crop, which is shallow rooted and needs a steady water supply during the growing season.

CULTIVATION AND MANURING.

The standard of cultivation, though hardly what it was a few years ago when economic and labour conditions were easier, is high, the strawberry readily responding to good tillage and liberal manuring. There are cases where the crop has been grown continuously for 30 years on the same land, old beds being ploughed in immediately the crop is finished, with a dressing of about 30 tons of dung per acre, and a young bed planted at once. In other cases the land is given a year's rest from strawberries, cabbage or potatoes being grown during the intervening year. In these latter the old bed is ploughed out in August or September and, if for autumn-planted cabbage, is dressed at the same time with dung or shoddy; or if potatoes are to follow, it is ploughed deeply later in the season. The potatoes are liberally manured with dung or shoddy and are given 6 to 8 cwt. per acre of a complete artificial manure at planting time. Such treatment leaves the land in good heart and tilth for planting strawberries the following August or September. Where cabbage is grown the land is cleared as early as possible in order to allow of planting the strawberries, if weather conditions allow, in July or August.

Surface tillage to keep down weeds and conserve moisture, is of the greatest importance, and the beds are horse and hand hoed as often as is practicable, to get the land really clean before bedding down with straw, preferably barley, at the rate of 18 to 20 cwt. per acre.

The strawberry plant practically replaces its root system each year, a primary system being developed from the base of the crown immediately after the fruiting season, and from this the fibrous secondary roots develop during spring and early summer. This is a matter of great practical importance to the grower. Every effort should be made to keep the soil up to the base of the plant so that the stem is kept moist. This encourages rapid root production, whereas pulling away the soil with the hoe tends to cause the stem to dry out and so hinders or even prevents this essential root production. Hoeing the soil away from the plants often results in the production of small stunted foliage the following season; this symptom often indicates some serious break-down of the root system whether from lack of roots, damage by water-logging or other causes. It is probable that the practice of some growers, of top-dressing strawberries with short dung after fruiting, has a very beneficial effect on autumn root production.

The costs of producing the crop are naturally high. Allowing for rent at £2 10s. to £3 per acre and estimating the life of a bed at three pickings, cultivations cost about £30 per acre. To this must be added the cost of marketing and picking (baskets, cartage, railway, market and salesmen's charges) which brings the total to about £50 per acre. It can be seen therefore, that with strawberries at 1s. per 2-lb. chip, it will be necessary to sell 1,000 chips per acre before expenses are covered.

PLANTING.

The necessity of using runners of a good stock or "strain" has been clearly proved experimentally and in the field during the last few years. Much of the early post-war trouble was due to the poor stocks of runners distributed when the industry was so rapidly expanding. There were so few good runner-producing beds, and such a demand for plants, that prices soared to £5 and £6 per 1,000 and runners were taken off indiscriminately and without regard to any kind of selection. Runners should be taken only from healthy, vigorous maidens, and it is desirable to limit the number of runners per plant to 5 or 6.

From about 16,000 to 22,000 runners per acre are planted, according to the distance of planting, which varies in the different districts, from 24 by 12 inches as a minimum to 30 by 14 inches. Autumn planting is most general and growers plant at the earliest practicable date. This is usually August, though occasionally it may be possible in late July. From such early planted runners a remunerative crop is generally obtained the first season.

MARKETING.

The South Hants growers, ever since the days when the 6-lb. wicker basket was the standard, have always been trying to improve their market package, and have gradually reduced the size to meet the requirements of the market. The 2-lb. chip basket is now the standard package of the district. A few 1-lb. chips are used for special fruits, and a good deal of early and special fruit is marketed in 1-lb. punnets. The standard of fruit packed is generally good considering the difficulties of dealing with a fruit that will not bear much handling and which must be graded by the pickers, who are not easy to obtain, or to supervise adequately. This problem of pickers is a serious one, as the supply of local skilled labour cannot cope with the work and outside labour is often unskilled and unreliable. The National Mark standard of packing has been adopted by a number of growers, but the majority still prefer to market under their own name or number, through

salesmen and buyers with whom they have built up a personal reputation.

Most of the fruit is despatched by the Southern Railway in special shelved vans. This Company deserves considerable credit for the way it has met the requirements of the industry by the provision of these vans, as well as special loading facilities and a fast goods service, at special rates. The latter carries the fruit to all parts of the country with the least possible delay, damage or loss. The train service covers all the main centres of consumption and a system of grouping the centres allows most of the fruit to run direct to its destination station in the same van into which it is loaded at the growers' end. With so easily damaged a fruit this is a great advantage, though, unfortunately, the fruit is not always so well treated after being taken off the train, a good deal of damage resulting from overcrowding in the markets. In recent years a considerable amount of fruit has been sent by road to local towns and to London, but the bulk of the fruit must, necessarily, be despatched by rail.

The numbers of packages consigned by rail are a good indication of the variation in the total crop year by year. The following table shows the serious decrease that has taken place in recent years :—

Year.	No. of Packages consigned by Rail.
1915	3,101,000
1916	No figures available
1917	" "
1918	1,823,482
1919	1,617,248
1920	2,089,609
1921	2,265,208
1922	3,417,160
1923	3,605,321
1924	2,759,789
1925	1,934,021
1926	2,358,742
1927	1,402,876
1928	2,341,931
1929	2,046,028
1930	1,891,881
1931	2,945,952

In 1915 the crop was marketed in 4-lb. chips, but by 1918 most of the fruit was being packed in 3-lb. chips. This package remained general for some 6 or 7 years. By 1925 the 2-lb. chip was being used by a number of growers and by 1928 had become the most generally used package. During the last three years practically all the dessert fruit has been sold in this package. It will be seen, therefore, that not only has the total number of packages declined but also the size of the

package. The total crop has varied between about 5,500 tons in 1915 (when the industry had not yet been seriously affected by War conditions), 1,600 tons in 1927, and 1,800 tons in 1930. The very low crops in these two years were directly due to climatic conditions; in 1927 the crop was heavily reduced by the occurrence of severe frosts while the plants were in flower, while in 1930 prolonged drought in spring and early summer prevented the fruit from swelling freely and so decreased the crop.

VARIETIES.

In the early years no special attention was paid to varieties. Such sorts as "Alice Maud," "Black Prince" and "Sir Joseph Paxton" were grown, the last named being popular for some years. The introduction to the district of "Royal Sovereign" led to growers specialising in early dessert fruit, for which the climatic conditions are favourable, and it may be said that this variety has largely made the industry in South Hants. "Leader," though its quality was always poor, was popular for a few years, while it still cropped heavily; subsequently it lost vigour and has now almost disappeared. "Noble" was another variety which cropped heavily, but was dropped for lack of quality. "Bedford Champion" and "Laxton" both had considerable trial, but eventually dropped out.

Since the War the demand for a variety to replace "Royal Sovereign" has been insistent, and though "The Duke" and "Madame Kooi" were extensively planted, both have now practically disappeared from the district. "Sir Joseph Paxton" is still grown by a few, but it also has suffered from the general decline in vigour and fruitfulness, besides being really too late for the district. "Madame Lefebvre" is the only serious rival to "Royal Sovereign" at the present time. It was introduced about 10 years ago and for the last 5 or 6 years has steadily increased, so that it now occupies perhaps 2,000 acres. It is a very vigorous grower and normally a heavy cropper, producing large dark fruits which are, however, when fully ripe, very soft and poor in flavour. It is a few days earlier than "Royal Sovereign" and the bulk of the crop ripens so quickly that almost daily picking is necessary; otherwise the fruit gets over-ripe and travels badly. Among more recently introduced varieties that have been planted fairly widely are "Oberschlesien" and "Tardive de Leopold." Both are vigorous growers and heavy croppers, the former having large bright-coloured fruit, the latter rather dark fruits which are not always of good shape. "Oberschlesien" has distinct promise for a district where earliness is not a special object, but for general use in South Hants it is probably a few days too late in ripening.

PESTS AND DISEASES.

Considerable loss of crop from insect and allied pests has occurred during the last few years, though much of the trouble has not been definitely traced to these attacks. Strawberry Aphis (*Capitophorus fragariae*) did serious damage to crops in 1927 and 1928, but attacks have been slight since then. In 1929 much damage occurred from Red Spider. Strawberry Mite (*Tarsonemus fragariae*) is considered by some authorities to be an important factor in relation to the decline of vigour and of cropping powers. It has been found in most of the local districts, though it is too soon to estimate the amount of damage which it causes. A pest of very considerable importance in South Hants is the Strawberry Blossom Weevil (*Anthonomus rubi*) which in some years causes serious losses and which always reduces the flowers to some extent. Cases have been known where as many as 25 to 30 per cent. of the blossoms have been destroyed by this pest. Numerous control methods have been tried with but little success. Chafer-grubs, wireworm, leather jackets, root-feeding weevils and millipedes all take their toll of strawberry plants. Fortunately, mildew, a serious trouble in most districts, is not often of any economic importance in South Hants. A careful survey of the pests and diseases of the strawberry is urgently needed in order that the incidence and relative importance of the various pests may be estimated and adequate control methods devised.

EXPERIMENTAL AND RESEARCH WORK.

In 1923 a station for trials and experiments in connection with local fruit problems, particularly of strawberries, was established by the Hampshire County Council at Botley, the local growers contributing to the purchase price through the Swanwick and District Fruit Growers' Association.

This Association, founded in 1905, includes among its members a majority of the local growers, and has proved of great assistance to the industry, *e.g.* in negotiating with the Railway Companies, publishing lists of reliable salesmen and generally protecting and promoting the interests of its members. A co-operative basket factory is run by the Association which also undertakes the supply of manures, straw, tools, etc., and gives assistance to growers in the disposal of jam fruit.

The land at the Botley Experimental Fruit Station is a sandy loam with some gravel, and, like much of the land in the district, is not too well drained. It was originally copse land, but had been cleared and used for agriculture for some years previous to 1922 and hence had little of the natural humus left in it at that date. It had, however, never been used for

strawberries. Eight acres were purchased in 1922 and an additional three acres in 1930.

Strawberries, as the most important fruit crop in the county, have claimed most attention, and a number of experiments and trials have been carried out, including Variety and Stock (or Strain) trials; Manurial experiments; Date of Planting trials; Runner selection, and Methods of Pest and Disease control.

Variety and "Strain" Trials.

These were begun in 1923 to discover if there were any varieties more suitable than "Royal Sovereign" for this district, and whether the wide differences to be seen in local beds of this variety were due to differences in soil and treatment, or to some other cause. These trials are still going on, but it is noticeable that the number of poor strains is now relatively small and that the average vigour and purity of stocks bought in are far above those of a few years ago.

This is, no doubt, largely due to the Ministry of Agriculture's Strawberry Certification scheme, which has tended to raise the standard, not only of actual certified stock, but all round. Growers, too, use more discrimination in the selection or purchase of stocks than they formerly did.

Typical results of these trials are given below:—

Trial Planted in 1923.

The following table gives the crop records in lb. per acre:—

Variety.		1924	1925.	1926.
		Lb.	Lb.	Lb.
Royal Sovereign	A.	740	4,640	5,740
" "	C.	460	3,430	2,080
" "	D.	820	2,620	4,020
" "	E.	700	1,660	620
The Duke	. . . . .	960	1,260	320
King George	. . . . .	220	1,000	560
Leader	. . . . .	280	1,820	Dead
Sturton Cross	. . . . .	1,100	3,880	6,300

The stocks of "Royal Sovereign" were all true to name, Strain E being fairly typical local stock, but strains A, C and D were from outside the district. The variation in cropping and vigour was remarkable, even as maidens, and caused considerable interest on the part of visitors.

"The Duke" cropped well as maidens, but rapidly deteriorated, and "Leader" died out completely during the second winter.

"King George" failed badly, and was indistinguishable from a poor strain of "Royal Sovereign."

"Sturton Cross," a local seedling, proved a heavy cropper of vigorous habit, but of only moderate quality and rather late.

It is no longer in cultivation in the district, as it had little commercial value.

Trial Planted in 1924.

Runners from the original plots, except of "Leader" and "Sturton Cross," were planted in 1924, and new stocks were introduced from Bedford, Devon, Hants, Kent, Notts and Somerset. This trial demonstrated that similar differences occurred among the stocks of "Royal Sovereign" in other districts to those that had been noticed in this county, and suggested that much of this deterioration might be due to lack of care in propagation. In the case of two stocks of "Duke" included in this trial, Stock G was very much superior in vigour to Stock T, which was found, later, to have been seriously over-propagated for two years before the original plants were obtained. "Madame Lefebvre" was included for the first time in this trial, and proved a vigorous grower and consistent and heavy cropper, even in 1927.

Trial Planted in 1925.

Runners from nine of the stocks of "Royal Sovereign" were planted in 1925, also from "King George" and from the two stocks of "Duke." Two new varieties, "Sterlingworth" and "The Frith," were also included. In all cases runners were carefully selected from the best plants, but, though there was some considerable all-round levelling up of the strains of "Royal Sovereign," the weak stocks were again, over the three years' cropping record, much below the average in yield. "King George" showed some improvement from the careful selection, but the stock was not up to the average stock of "Royal Sovereign." "Duke" (Strain T), although quite good runners were planted, failed, and in the winter of 1926-27 died out entirely; whereas the other strain of this variety averaged well over the 3 years. "Sterlingworth" proved a heavy cropper of vigorous habit, but the flavour, texture and colour of the fruit were very poor. This variety has also proved very subject to mildew. "Frith" has proved disappointing, the crops, though of excellent quality, being very light. The constitution seems weak and a number of the plants die out each spring, for no apparent reason.

In 1926 further trials with a number of stocks of "Royal Sovereign" and other varieties were planted. The following April severe frosts crippled the plants and destroyed what prospects were left for a crop in 1927, besides seriously injuring the plants themselves. The disastrous season of 1929 again upset this trial, but it is worth noting that "Madame Lefebvre"

withstood the adverse conditions far better than "Royal Sovereign" and produced good crops in both 1928 and 1929.

"Duke" and "Sterlingworth" were also in this trial less affected by the weather than "Royal Sovereign."

Trial Planted in 1927.

A further trial was planted this season of the same varieties as in 1925, most of the runners being from stocks that had been grown at the Station for two or more years. There was still some variation in the stocks of "Royal Sovereign," although careful selection had levelled them up considerably and the weak Stocks K and L were still below the others. Owing to rather late planting, crops were very small in 1928, but "Madame Lefebvre" was again outstanding, being the heaviest cropper in 1929, 1930 and 1931.

The table below gives the crop records in lb. per acre:—

	Variety.	1929. Lb.	1930. Lb.	1931. Lb.
Royal Sovereign	C.	816	4,832	3,952
"	C.1	664	3,872	3,496
"	C.4	1,256	4,672	4,448
"	G.1	504	3,104	2,352
"	G.2	560	3,808	1,744
"	G.3	608	3,232	2,952
"	K.	312	3,120	3,152
"	L.	480	2,288	2,144
"	P.	1,136	3,328	2,904
King George	.	616	2,848	3,504
Duke	.	1,128	3,808	4,448
Sterlingworth	.	1,032	3,824	5,440
Frith	.	904	2,128	832
Madame Lefebvre	.	2,368	5,760	7,344

Testing of varieties and stocks is being continued, and in 1928 a number of stocks of "Royal Sovereign" and other varieties, that had been certified under the Ministry of Agriculture's scheme, were planted. Some of the stocks failed to establish themselves well and suffered rather severely from the extreme drought of 1929, but on the whole the stocks were very good and demonstrated that excellent commercial stocks of "Royal Sovereign" and other varieties are now available to the grower. No crops were recorded from this plot in 1929, but the 1930 crops were good, some of the stocks of "Royal Sovereign" yielding over 2 tons per acre and comparing well with "Madame Lefebvre."

Manurial Experiment.

This experiment was started in the autumn of 1923; about 1½ acres being laid out, chequer-board fashion, in plots of one

twentieth acre each, to which various manurial dressings were applied, there being three plots for each treatment and three plots left entirely unmanured as controls.

The main objects of this experiment are to compare the relative value of :—

- (a) Dung.
- (b) Dung plus a complete annual mineral top-dressing.
- (c) Complete minerals annually as top-dressing.
- (d) Bulky organic nitrogenous manures (such as shoddy) supplemented annually with potash and phosphates.
- (e) Complete concentrated organic manures (such as blood and bones) annually as top-dressing.
- (f) Potash deficiency plots.

The land had received no dung for two years previous to planting, but a crop of potatoes was grown in 1923, to which a complete mineral mixture was applied. Each plot was planted with an equal number of two distinct stocks or strains of "Royal Sovereign," and the whole plot formed a striking demonstration of the variations in vigour that were then general in this variety. The better stock averaged nearly thrice the crop of the other during 1924, 1925 and 1926, after which the poorer stock was ploughed in, the other being left for a fourth crop.

Certain differences were noted, as a result of weather conditions. A strip at the south end of the experiment proved to be wetter than the remainder, and the excessive moisture caused a distinct depreciation of the crop in 1925, though improving it in the drier summer of 1926. It was decided to omit this wet strip when the experiment was replanted in 1926-27, reducing the number of plots to 20. The plots were all planted with a carefully selected stock of "Royal Sovereign," and the same manurial treatment was repeated on each plot.

Crop records have provided little definite information, but the plots dressed with complete minerals each spring compared favourably with those to which dung had been applied. The shoddy dressings appeared to be producing more effect than in the first experiment. The experiment was again ploughed out in 1930 and replanted with good stocks of "Royal Sovereign" and "Madame Lefebvre," in equal numbers on each plot.

The effect of weather has been very marked, the bulky manures scoring in dry seasons, while the soluble concentrated mixtures, applied in February or March, have produced their best results in seasons with a showery spring. Experiments are in progress in the use of green manures, but have not yet yielded definite results; the use of Winter Vetches and *Trifolium incarnatum* can, however, be recommended as a means of supplying humus to the soil.

Date of Planting Trials.

At one time most strawberries were planted in the spring, no crop being expected in the maiden year. With autumn planting becoming general fair crops were occasionally obtained from the maiden plants. This suggested the idea of planting at stated intervals to obtain information on the effect of time of planting, not only in the maiden year but throughout the existence of the bed.

It was arranged to plant at intervals of four weeks from mid-August to mid-October, and again in spring as soon as conditions were suitable. In 1927 and 1930 it was possible to plant in July, and in those years a July-planted plot was also included. These trials have proved conclusively the value of early planting for this district, the earlier planted plots having produced heavier crops throughout, not only as maidens but in the second and even third year. The time of planting must depend on the weather, but, over a series of years, the weather conditions at planting time have varied and the earlier plantings have always held their own. The crop records from plants put out in the 1924 and 1925 trials are given below in lb. per acre :—

Planted.	Crops.				
	1925. Lb.	1926. Lb.	1927. Lb.	1928. Lb.	1929. Lb.
August, 1924	1,410	3,225	2,760	2,802	
September, 1924 . . .	1,191	2,625	2,172	2,802	
October, 1924	750	2,025	1,476	2,595	
February, 1925	—	750	864	2,388	

The autumn plantings were done under excellent soil and weather conditions, but the spring planting suffered considerably from a dry spell, and this bed never recovered from its bad start.

Similar crop records are given below from the plots planted in 1925 and 1926 :—

Planted.	Crops.				
	1926. Lb.	1927. Lb.	1928. Lb.	1929. Lb.	1930. Lb.
August, 1925	351	1,584	3,872	2,793	
September, 1925 . . .	297	1,470	3,699	2,256	
October, 1925	174	1,326	3,168	1,872	
February, 1926	87	879	3,615	1,800	

In this season planting conditions were very different ; the runners planted in August had no rain for three weeks and dried up badly, but they recovered and produced slightly better results than those planted under ideal weather conditions in September. The land was getting wet and cold in October and the plants did not get away well, but the spring-planted runners went in under excellent conditions.

Conditions were ideal for early planting in 1927, there being

plenty of runners, and showery weather in July and August, although by the end of August the continued rain had made the soil cold. The later plantings were much below the earlier ones. Crop records in lb. per acre from the plot planted 1927-28 are given below :—

Planted.	Crops.				
	1928. Lb.	1929. Lb.	1930. Lb.	1931. Lb.	
July, 1927 . . .	2,008	2,600	4,968	3,744	
August, 1927 . . .	736	1,088	3,592	3,168	
September, 1927 . . .	304	584	3,432	3,328	
October, 1927 . . .	104	744	4,344	3,736	
February, 1928 . . .	104	776	3,688	3,576	

The satisfactory establishment of a strawberry bed is of great importance to its subsequent success, and the value of planting at the earliest practicable moment, in this district, can hardly be over-estimated. A good primary root system enables the young plant to get a firm hold on the soil, and so reduces the danger of lifting by frost. It also forms the basis of a good secondary root system in spring.

Summary.

The following practical conclusions may be drawn from our experience during the period covered by this report :—

Varieties.—No variety has yet been found so generally desirable for this district as “Royal Sovereign,” but “Madame Lefebvre” has become very popular on account of its robust constitution, heavy cropping and earliness, though its appearance and quality are inferior to “Royal Sovereign.” There are still considerable variations in stocks of certain varieties, but plenty of good stocks are now available, and the standard of vigour and purity has generally improved. “Oberschlesien” and “Tardive de Leopold” have proved useful varieties well worth a trial.

Manures.—Manuring remains a problem, but the crop records, so far, suggest that satisfactory crops can be grown without dung. It is interesting to note that the whole of the strawberry trials at Botley, except the manurial experiments, have received concentrated manures only (either mineral or organic) and that the plants generally are not below the average of those to which dung has been applied. Manures for top-dressing should be complete mixtures, and should be applied as early in the year as is practicable, if possible not later than the end of March.

Planting.—Repeated experiments, under varying climatic conditions, have demonstrated that runners should be planted at the earliest practicable date after July. Early planting produces strong maidens and encourages the production of early runners from them.

Propagation.—Care should be taken in selecting runners, which should be taken, in limited numbers, from vigorous healthy stock and, preferably, from maidens.

General Culture.—Every effort should be made to keep a "soil-mulch," by early and frequent hoeing, and beds should be cleaned up and well hoed as soon as possible after the fruiting season. Surface tillage should be relied on as far as possible, but where deeper tillage becomes necessary it should be done in early winter. Deep cultivation among strawberries in spring often seriously damages the plant. Care should be taken not to hoe soil away from the plant; rather should it be slightly pulled up to them, to encourage root production from the base of the crowns during late summer. Adequate drainage is essential, as strawberries will not succeed if waterlogged in winter.

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Winchester.

THE CATTLE CLASSES IN THE CARCASS COMPETITION OF THE SMITHFIELD CLUB, 1895-1930.

A CARCASS COMPETITION for cattle, sheep and pigs was instituted in 1895 as part of the Annual Show of the Smithfield Club. This competition has been held every year since that date, excepting the two years 1917 and 1918, when no Show was held. It has become an important feature of the Show and causes a great deal of interest amongst all concerned in the raising and finishing of stock. Breeders, feeders, butchers and herdsmen all display great eagerness to see how the animals have killed. It is doubtful if any single competition or exhibition held in this country in connection with live stock equals the Carcass Competition as regards its educational value amongst all the various classes engaged in the production and distribution of meat. Although the number of exhibits in the cattle classes is not large (the lowest number was 14 in 1902 and the highest 51 in 1926), most of the exhibits are of a high standard of excellence, and provide a reliable guide as to the most desirable type of carcass. In addition, the opportunity for examining the exhibits before and after slaughter enables exhibitors and others to make themselves acquainted with the faults as regards conformation, degree of fatness, evenness of fleshing, etc., which should be avoided if the highest quality of carcass is to be produced.

CLASSES.

In the first three years of the Competition, there were two classes for cattle, one for steers not exceeding 2 and another for steers above 2 and not exceeding 3 years old. In 1898 a class was added for heifers not exceeding 3 years. After that the classes remained the same until the 1921 Show, when a class was created for steers or heifers not exceeding 15 months. From that date until the 1930 Show there has been no change, *i.e.*, there have been four classes, one for steers or heifers under 15 months, one for steers above this age and not over 2 years, one for steers over 2 and not exceeding 3, and another for heifers not exceeding 3 years old. No separate classes are reserved for Crossbreds, as in the case of sheep. All breeds and crosses of cattle compete in the same classes, exhibits being classified solely according to age.

JUDGING.

The cattle are weighed on arrival, and on the first day of the Show (Monday) they are taken away for slaughter, records being kept of the weight of the carcass and of the various parts of the offal. The carcasses are then judged, and are open for inspection by the public on the Wednesday. Two judges are selected each year, one from London and one from the provinces. The same judge is never appointed in two consecutive years. The method adopted in the selection of judges ensures that prizes are awarded for the carcasses most likely to please the average efficient meat salesman in contact with a large buying public.

From 1898 to 1914 the cattle entered in this Competition were judged alive on the Monday as well as dead on the Wednesday by the same judges. The prizes were awarded, of course, strictly on the carcass judging, the live judgments being made merely for their educational value. A comparison of the awards to the cattle when alive and when dead shows the difficulty experienced even by experts in selecting from a number of live cattle the one which will give the best carcass. During this period 51 cattle classes were judged before and after slaughter. In 25 of these, the animal placed first when alive was not placed first as a carcass. Again, 17 Championships were awarded, and in 10 of these the animal with the Champion carcass was not put first even in its own class. The difficulty of selecting the animal with the best carcass did not, however, prove so great as in the case of sheep. In the case of the Championships awarded for sheep carcasses [1], the animal giving the Champion carcass was not put first even in its own class in 13 out of 17 occasions.

BREEDS REPRESENTED.

Table I shows the number of exhibits in the Cattle Carcass Classes and also the proportion of exhibits represented by the various breeds and by Crossbreds in each year. The importance of Crossbreds, Aberdeen Angus, Galloway and Welsh Black; as regards the number of exhibits contributed, is obvious. These cattle are evidently considered as capable of providing carcasses suitable for this competition. During the whole period of the competition, only 7 Herefords have been shown; the Shorthorn entries have been more numerous than the Herefords, but not so numerous as those from less widely known breeds such as the Welsh Black. The absence of a particular breed, or its appearance in very small numbers, need not necessarily be due to unsuitability of carcass, but may be due to other reasons, such as lack of enthusiasm for this competition, or to lack of resources on the part of its breeders and feeders.

Table II gives the breed and weight of the First Prize Carcass in each class during the period of the competition. Crossbreds have been exhibited in greater numbers than any of the pure breeds, and have secured a greater number of first prizes. Out of 109 first prizes, Crossbreds have secured 59, Galloway 21, Aberdeen Angus 21 and Welsh 8. Herefords and Shorthorns have gained no first prizes. The most successful cross has proved to be that between the Aberdeen Angus and Shorthorn, over half of the first prizes gained by Crossbreds having been awarded to this particular cross. This cross has proved especially successful in the "baby beef" class, having gained 6 out of the 10 first prizes. An examination of the prize awards during the last 10 years, however, in classes other than the baby beef class reveals the fact that Galloways have more than held their own against the Crossbreds, having captured 17 out of 30 First Prizes and 8 Championships out of 10.

WEIGHT OF EXHIBITS.

Table II includes the weight of First Prize carcasses in each class in each year, and Table III gives the average weight of First Prize carcasses in the first, middle and last periods of the competition. From the last column of Table III it is seen that the average weight in the last period has decreased about 6 per cent., as compared with that in the first period. This compares with a reduction of 20-30 per cent. in the case of First Prize sheep's carcasses. [1]

It is interesting to observe that, in each of the three periods the average weight of First Prize carcasses in the class for heifers

TABLE I.

TOTAL NUMBER OF EXHIBITS EACH YEAR, AND PROPORTION REPRESENTED BY VARIOUS BREEDS AND CROSSBREEDS.

Year	Total Number of Exhibits	Percentage of Exhibits represented by :—						
		Cross-bred	Aberdeen Angus	Devon *	Galloway	Red Poll	Welsh	Other Pure Breeds
1930	33	36	24	6	21	6	3	4
1929	33	46	15	3	15	12	6	3
1928	40	25	15	—	30	12	10	8
1927	36	36	14	—	11	17	6	16
1926	51	35	18	10	12	16	2	7
1925	45	45	20	7	13	7	4	4
1924	45	35	18	13	16	7	2	9
1923	27	19	30	8	15	8	4	16
1922	30	30	37	10	10	3	—	10
1921	24	46	30	4	8	4	4	4
1920	20	55	25	—	10	—	—	10
1919	16	62	13	—	6	—	13	6
1918	15	60	20	—	13	—	7	—
1915	23	48	17	9	17	—	9	—
1914	26	61	12	4	8	4	8	3
1913	34	50	15	3	15	—	9	8
1912	37	65	16	1	1	—	11	6
1911	27	59	30	—	4	—	4	3
1910	36	55	20	—	11	—	14	—
1909	29	48	14	—	14	—	10	14
1908	40	55	13	—	—	—	22	10
1907	33	49	18	6	3	3	15	6
1906	32	63	—	3	9	3	22	—
1905	22	59	4	—	4	0	19	5
1904	31	39	16	—	10	6	20	9
1903	22	41	14	—	5	—	14	26
1902	14	57	28	—	—	—	7	8
1901	24	50	25	—	12	—	4	9
1900	15	73	13	—	—	—	—	14
1899	15	27	7	7	13	—	13	33
1898	34	41	9	12	17	3	6	12
1897	23	35	4	4	21	4	4	28
1896	23	26	13	4	21	—	13	23
1895	18	28	11	5	17	5	—	34

* This column includes South Devons in the years 1898, 1899, 1906, 1907, 1914, 1925, 1926.

TABLE II.
BREED AND CARCASS WEIGHT OF FIRST PRIZE WINNERS.

Year	Steer or Heifer under 15 Months			Steer under 2 Years Old *			Steer over 2, but under 3 Years			Heifer not over 3 Years		
		st. lb.			st. lb.			st. lb.			st. lb.	
1980	Angus X Short †	88 7	Galloway †	86 7	Crossbred	106 1	Angus X Short	106 1	Angus X Short	88 4		
1989	Crossbred	70 6	Galloway	83 5	Galloway	124 0	Galloway †	124 0	Galloway †	75 5		
1988	Angus X Short	65 5	Galloway	83 8	Galloway †	125 2	Galloway	125 2	Crossbred	94 3		
1987	Angus X Short	70 8	Angus X Short	124 2	Galloway	117 0	Galloway	117 0	Galloway †	104 1		
1986	Angus X Short	72 2	Angus X Short	109 1	Galloway	112 0	Galloway	112 0	Aberdeen Angus †	85 6		
1985	Angus X Short	67 1	Galloway †	94 2	Galloway	124 2	Welsh	124 2	Aberdeen Angus	79 1		
1984	Angus X Short	67 1	Aberdeen Angus	97 0	Welsh	116 6	Welsh	116 6	Aberdeen Angus †	90 7		
1928	Red Poll	50 4	Galloway †	112 1	Galloway	118 2	Galloway	118 2	Crossbred	111 5		
1922	Angus X Short	65 5	Galloway	100 0	Galloway	105 6	Galloway	105 6	Galloway	90 2		
1921	Aberdeen Angus	60 2	Angus X Short	98 0	Crossbred	97 6	Galloway †	97 6	Galloway †	90 1		
1920	—	—	Angus X Short	107 5	Angus X Short	117 6	Crossbred †	117 6	Crossbred †	93 4		
1919	—	—	Shorthorn	110 1	Angus X Short †	139 7	Angus X Short †	139 7	Aberdeen Angus	83 0		
1918	—	—	Angus X Short †	90 7	Angus X Short	117 0	Angus X Short	117 0	Aberdeen Angus	110 7		
1915	—	—	Angus X Short	89 7	Angus X Short	112 7	Angus X Short	112 7	Aberdeen Angus †	88 1		
1914	—	—	Angus X Short	97 1	Crossbred †	108 5	Crossbred †	108 5	Aberdeen Angus †	91 1		
1913	—	—	Angus X Short	101 6	Galloway	114 3	Galloway	114 3	Aberdeen Angus †	92 4		
1912	—	—	Angus X Short †	104 3	Crossbred	106 0	Crossbred	106 0	Aberdeen Angus	100 1		
1911	—	—	Crossbred	96 1	Aberdeen Angus	94 3	Aberdeen Angus	94 3	Aberdeen Angus	102 0		
1910	—	—	Angus X Short †	98 5	Highland	119 5	Highland	119 5	Angus X Short	117 3		
1909	—	—	Crossbred †	120 2	Crossbred	107 5	Crossbred	107 5	Angus X Short	98 0		
1908	—	—	Angus X Short	94 1	Crossbred	114 5	Crossbred	114 5	Angus X Short	82 7		
1907	—	—	Aberdeen Angus †	108 0	Crossbred	114 5	Crossbred	114 5	Crossbred	117 4		
1906	—	—	Crossbred	103 1	Crossbred	124 4	Crossbred	124 4	Crossbred	77 7		
1905	—	—	Welsh	109 1	Welsh	139 0	Welsh	139 0	Angus X Short †	101 4		
1904	—	—	Angus X Short	120 6	Angus X Short †	133 3	Angus X Short †	133 3	Aberdeen Angus	92 5		
1903	—	—	Welsh	94 4	Welsh †	120 7	Welsh †	120 7	Angus X Short	96 2		
1902	—	—	Crossbred	83 5	Welsh	136 3	Welsh	136 3	Aberdeen Angus †	113 4		
1901	—	—	Welsh	133 6	Welsh	114 2	Welsh	114 2	Aberdeen Angus	111 1		
1900	—	—	Crossbred †	98 3	Aberdeen Angus	109 6	Aberdeen Angus	109 6	Aberdeen Angus †	102 1		
1899	—	—	Crossbred	109 4	Aberdeen Angus †	116 6	Aberdeen Angus †	116 6	Crossbred	83 4		
1898	—	—	Galloway †	95 3	South Devon	130 6	South Devon	130 6	Galloway	92 5		
1897	—	—	Crossbred	96 7	Galloway	112 4	Galloway	112 4	No class	—		
1896	—	—	Aberdeen Angus	97 2	Welsh	128 0	Welsh	128 0	No class	—		
1895	—	—	Crossbred	108 6	Highland	134 6	Highland	134 6	No class	—		

* Since the institution of the class for steers or heifers under 15 months, this class has been changed to "Steer above 15 months, but not exceeding 2 years." † "Angus X Short" is used for first cross from Aberdeen Angus and Shorthorn. All other crosses are entered as "Crossbreds."

TABLE III.
AVERAGE WEIGHT OF FIRST PRIZE CARCASSES

	Period						Percentage De- creased between First and Last Period
	1898-1907		1908-1919		1920-1930		
	st.*	lb.	st.	lb.	st.	lb.	
Steers under 2 years .	105	7	100	3	100	1	5
Steers over 2 but under 3 years	122	0	112	6	114	4	6
Heifers not over 3 years	98	6	96	5	91	7	7

* Stones of 8 lb.

not exceeding 3 years old is appreciably smaller than that in the class for steers under 2. If the average weight of all exhibits, and not merely of First Prize carcasses, be examined, as in Table IV, it will be seen that there is very little difference in this respect between those of the steers under 2 and the heifers under 3.

TABLE IV.
AVERAGE LIVE AND CARCASS WEIGHTS OF ALL EXHIBITS
IN EACH CLASS.

	1898-1907			1908-1919			1920-1930			Percentage Decrease from First to Last Period (Dead Weight)
	Live	Dead	No. of Exhibits	Live	Dead	No. of Exhibits	Live	Dead	No. of Exhibits	
	lb.	lb.		lb.	lb.		lb.	lb.		
Steers under 2 years	1,246	796	106	1,221	782	96	1,147	729	111	8
Steers over 2, under 3	1,480	954	120	1,416	915	88	1,392	879	65	8
Heifers not over 3 years	1,227	792	73	1,189	768	88	1,157	739	91	7

It is apparent that, although exhibitors are allowed three years for the production of their heifers, the average weight of the heifers exhibited is not more than that of steers in the class for steers not over 2 years, being approximately 10½ cwt. live and 739 lb. dead weight. This weight is evidently considered very desirable.

The reduction in the weight of first prize carcasses, shown in Table III, is accompanied by a reduction of similar magnitude

in the average weight of all the exhibits in each class. This reduction amounts to 8 per cent. in the case of steers and 7 per cent. in that of heifers. Wentworth [2] showed that a decrease in weight has occurred in the case of both show cattle and market cattle in the U.S.A. An examination of the Smithfield results in greater detail, as in Table V, shows, however, that the carcass competition appears to have established the fact in the first few years of its existence that the large, coarse carcass was undesirable. In the class for steers between 2 and 3 years old, for instance, the average live weight of exhibits was over 1,600 lb. in 1895 and 1896, and well over 1,500 lb. in 1898, 1899 and 1900. After 1900, however, the average weight of exhibits in this class has only exceeded 1,500 lb. in one year, *viz.*, 1919, a year of abnormal conditions. A similar substantial decrease in the first few years of the competition was observed in the case of sheep. [1]

A comparison of the weights of cattle of similar breed shown in similar age classes in the "Live" and "Carcass" classes at the Smithfield shows that a heavier animal is favoured in the former classes. In the class for steers over 2, but not exceeding 3 years, in the 10 years ending 1930, the Galloway exhibits in the Live Classes averaged 1,543 lb., and those in the Carcass Classes 1,341 lb., a difference of 15 per cent. Similarly, in the case of the Welsh cattle, the exhibits in the Live Classes were 17 per cent. heavier than those in the Carcass Classes. In the case of Crossbreds the difference is 22 per cent. if the Crossbreds in the Carcass Classes are compared with first crosses in the Live Classes. Two different types of animals seem to be shown in the Live and Carcass sections of this Show; it is fairly generally recognised that exhibits in the Live Classes would stand very little chance of success in the Carcass Classes. Hammond [3], discussing the results to 1913, makes the observation that the "difference should not exist if they (the competitions) are both designed to demonstrate the best quality and the most economical beef animal."

PROPORTION OF CARCASS.

Table V shows the average live weight on arrival of the exhibits in each class (excluding those under 15 months) each year, and also the proportion of carcass expressed as percentage of live weight. The average proportion of carcass in a particular class does not show very large fluctuations from year to year. Thus, from 1895 to 1930, the carcass percentage varied from 62.2 to 65.1 in the class for steers under 2, from 63.1 to 66.4 per cent. in the class for older steers, and from 60.2 to 65.8 in the class for heifers. The proportion of carcass is rather smaller in the period 1920-30 than in the first periods of the competition.

TABLE V.

AVERAGE LIVE WEIGHTS (IN LB.) OF ALL EXHIBITS IN EACH CLASS.

Year	Steers under 2		Steers over 2 but under 3 years		Heifers not exceeding 3 years	
	Live Weight	Carcass Percentage	Live Weight	Carcass Percentage	Live Weight	Carcass Percentage
1930	1,116	64.0	1,337	63.1	1,135	64.7
1929	1,089	63.8	1,353	64.6	1,030	64.3
1928	1,172	62.8	1,340	63.3	1,119	63.7
1927	1,182	64.3	1,394	64.9	1,104	64.7
1926	1,141	62.5	1,360	63.5	1,075	64.3
1925	1,139	63.9	1,446	63.8	1,163	64.2
1924	1,141	63.3	1,486	64.6	1,188	65.3
1923	1,127	63.8	1,374	65.1	1,195	64.0
1922	1,140	62.8	1,368	65.0	1,204	65.6
1921	1,144	63.6	1,373	64.4	1,255	65.1
1920	1,243	64.0	1,496	64.0	1,163	65.1
1919	1,160	63.0	1,615	65.0	989	63.0
1916	1,120	63.9	1,366	64.2	1,188	64.9
1915	1,268	64.6	1,338	63.6	1,111	63.8
1914	1,215	62.2	1,434	64.3	1,177	64.5
1913	1,163	65.0	1,331	64.2	1,115	64.7
1912	1,210	64.6	1,345	64.0	1,165	64.6
1911	1,260	65.0	1,464	63.9	1,222	64.5
1910	1,226	64.9	1,446	65.7	1,261	64.4
1909	1,214	63.8	1,461	65.5	1,201	65.8
1908	1,263	65.0	1,445	64.1	1,310	65.5
1907	1,267	65.1	1,396	64.6	1,172	65.4
1906	1,208	64.4	1,392	64.9	1,234	64.5
1905	1,155	63.4	1,406	64.5	1,287	64.8
1904	1,237	64.8	1,418	64.9	1,202	65.2
1903	1,184	62.4	1,368	63.2	1,222	64.0
1902	1,193	62.7	1,453	64.7	1,213	64.0
1901	1,204	63.8	1,374	63.2	1,180	63.0
1900	1,295	64.2	1,570	63.1	1,297	62.0
1899	1,154	63.4	1,523	64.6	1,110	60.2
1898	1,181	63.3	1,529	64.3	(1 entry) 1,293	65.2
1897	1,248	63.0	1,453	63.4	No class	—
1896	1,356	64.0	1,604	65.0	No class	—
1895	1,361	64.7	1,646	66.4	No class	—
Mean	1,202 lb.	Mean 64.3	Mean 1,439 lb.	Mean 64.2	Mean 1,183 lb.	Mean 64.4

Table VI shows the average proportion of carcass in each class for each of the three periods of the competition.

TABLE VI
VARIATION IN PROPORTION OF CARCASSES

Class	Average Percentage of Carcass		
	1898-1907	1908-1919	1920-30
Steers under 2 years	63.9*	64.9	63.5
Steers between 2 and 3 years	64.4*	64.6	63.2
Heifers under 3 years	64.5	64.4	63.9

* Steers exhibited in 1895, 1896 and 1897 included.

Thus, the proportion of carcass is smaller in each of the three classes during the last 10 years than during the first and middle periods of the competition. In the steer classes the proportion of carcass in the post-war period shows a reduction of 1.4 per cent. over that in the period ending in 1919, and in the heifer class the reduction amounts to 0.5 per cent. The reduction cannot be explained by a change in the age of the average exhibit, and is probably due to the exhibits of recent years being less fat. There is not, however, a corresponding and consistent reduction in the proportion of suet and gut fat; the amount of these constituents is probably too small to reflect differences corresponding to about 1 per cent. reduction in the proportion of carcass.

Sex had very little effect on the proportion of carcass. Thus, taking the mean of all entires up to 1930 in the class for steers under 2, steers over 2 and under 3, and heifers not exceeding 3, the proportions are 64.3 per cent., 64.2 per cent. and 64.4 per cent. respectively. Hammond, discussing the results up to 1913, found the proportion of carcass slightly higher in steers than in heifers. Table VI shows that, in the post-war period, the proportion of carcass has been higher in the heifer class than in the two steer classes.

Age has no appreciable effect on the carcass proportion in the older classes, a difference of only 0.1 per cent. being found in the average carcass percentage of steers under 2 years old and of the older steers during the whole period of the competition. The proportion of carcass in the class for steers and heifers not exceeding 15 months is, however, considerably lower than in the others. The average carcass percentage of 86 exhibits in the "baby beef" class from 1921 to 1930 is 60.8, while the corre-

sponding figures for steers not exceeding 2, older steers, and heifers not exceeding 3 years old are 63.5, 63.2 and 63.9 respectively.

BABY BEEF.

A class for steers and heifers not exceeding 15 months was instituted in 1921 owing to general interest in "baby beef." The number of exhibits each year in this class has averaged nearly 9, and has varied between 3 (in the 1921 Show) and 15 in the 1926 Show. The live weight of the exhibits has averaged 813 lb. for the 10 years during which this class has been in existence at the Show.

Reference to Table II shows the breed of the First Prize winner each year in the baby beef class. An interesting feature is provided by the success of crosses from an Aberdeen Angus sire and a Shorthorn cow. This cross, although it has not been the most numerously represented type in the baby beef class, has secured 6 out of the 10 first prize awards; in addition, 2 of the remaining first prize winners were sired by Aberdeen Angus bulls. The success of the cross from an Aberdeen Angus sire and a Shorthorn cow in a competition where early maturity is of such great importance, adds interest to Hammond's [3] observation that this cross is more early maturing than the reciprocal cross, *i.e.*, than that from a Shorthorn bull and an Aberdeen Angus cow. This can possibly be explained by the supposition that the average Shorthorn dam would provide her calf with more milk than the average Aberdeen Angus.

CONCLUSIONS.

1. Up to 1914 the cattle exhibits for the Carcass Competition were judged alive first of all and afterwards as carcasses by the same judges. A comparison of the live and dead judgments shows the difficulty experienced even by experts in selecting from a number of good animals the one likely to yield the best carcass.

2. The exhibits have been mostly Crossbreds, Aberdeen Angus, Galloway and Welsh. Taking the period as a whole, Crossbreds, the type most numerously represented, have gained most First Prizes, but in the last 10 years the Galloways have won most Championships and First Prizes in the classes other than the baby beef class. In the class for exhibits not exceeding 15 months, a cross from an Aberdeen Angus sire and a Shorthorn cow has been the most successful type of exhibit.

3. A comparison of weight of carcasses in the classes (excluding that for cattle not exceeding 15 months) shows a reduction of approximately 8 per cent. in the last 10 years as compared with the first 10 years of the competition.

4. In the 10 years ending 1930, the first prize carcasses in the

class for steers under 2, steers over 2 but under 3, and for heifers not over 3 years old, have averaged respectively 801 lb., 916 lb. and 735 lb.

5. The greatest reduction in the weights of exhibits occurred in the first few years of the competition, *i.e.*, before 1900.

6. A heavier and fatter type of animal is shown in the "Live" than in the "Carcass" classes.

7. The proportion of carcass is smaller in the last 10 years than during the first or middle periods of the competition. Sex had very little effect on the proportion of carcass. The proportion of carcass expressed as percentage of live weight in the baby beef class has averaged 60·8 from 1920 to 1930. During the same period the proportion in the other classes varied between 63·2 and 63·9.

I wish to express my thanks to Professor R. G. White and to Mr. Leonard Bull, Secretary of the Smithfield Club, for reading through the manuscript and for suggestions made.

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WOOL MARKETING UNDER CO-OPERATIVE METHODS.

SOME few years ago Lord Ernle made the remark that the mere mention of any of the words co-ordination, correlation or co-operation at a meeting of agriculturists was enough to blanket all further interest in the proceedings. One is glad to note that this prejudice is not so general as it was. The English farmer has of course always been a strong individualist and is still sometimes apt to think that he himself is perfectly capable of marketing his produce to the best advantage. In regard to some commodities this is probably true, but with regard to wool it is submitted that the individual farmer can hardly become a good judge either of the value of his wool or of the proper time to sell it. He cannot in fact afford to give the necessary time to acquire sufficient experience of what is usually, after all, a minor side of his business. It is moreover a well-known fact that graded wool, offered in bulk, will always command a better price per pound than the same wool offered ungraded in small quantities. No individual farmer in the British Isles has

enough wool to justify the employment of a grader, or to be able to offer his produce in properly graded lots of the size that the consumers want. The common custom in the past has been for the farmer to sell his wool to a local dealer, at a price which is often far below its intrinsic value. Before the war the price was generally an all-round one for the whole consignment, and in far too many cases this arrangement still prevails. This price is rarely a true average value of the various qualities that compose the clip; in some cases even now it is very near to the worth of the poorest quality. Even in a small flock of well-selected sheep belonging to a single breed there will generally be a few fleeces of considerably less value per pound than the bulk, and the value of these inferior fleeces will frequently be offered and accepted for the whole. It is manifest therefore that if a small producer has a flock of mixed breed, and packs the various qualities together, he will secure a price far below the average value of his consignment. Moreover, such a flat-rate price is sometimes imposed by the dealer on all the farmers in a district, lest the sellers should compare prices and some be dissatisfied. There is no inducement under this system for one farmer to produce better wool than his neighbour. It is submitted therefore that the only rational method of marketing British wool is by co-operative methods.

It is true that before the initiation of co-operative wool marketing associations some progress had been made by substituting public auctions for private sales. In Kent, for example, it was formerly accepted that Lamb's wool was worth half the price of Fleece wool, while Locks were worth anything that the dealer cared to give. Then some go-ahead farmers, suspecting that they were not getting fair prices, tried the experiment of selling by auction. This step resulted in materially higher prices for Lamb's wool and Locks and brought about a much wider range in the values of Fleece wools of varying quality because it increased competition. Mr. A. J. Burrows, F.S.I., of Ashford, Kent, was one of the first auctioneers to start such sales in 1909. Public auctions were also started at Rye in Sussex and elsewhere. This was a step in the right direction, but it did not go far enough. Such auctions are still held in many places, but in Kent, owing to the existence of Kent Wool Growers at Ashford, they have been discontinued. Naturally, because these sales increased competition, all the local wool buyers were dead against them and prophesied their complete failure.

About 1912 an Australian and Patagonian sheep farmer, Mr. Digby Grist, came home to this country. He happened to ask a Cotswold farmer friend where he sold his wool and was told that it went to local dealers. He expressed surprise that the English farmer should fail to take advantage of London, the

biggest and best wool market in the world, while Australian and Patagonian sheep farmers sent their wool thousands of miles in order to secure its advantages. The reason was of course that the individual English farmer had not enough wool. Mr. Digby Grist realised that the advantages of the London market could only be obtained by bulking supplies co-operatively and he accordingly started co-operative Wool Selling Societies in Yorkshire and Carnarvonshire. In 1914, however, came the war, when all wool was requisitioned by the Government, so that operations were perforce suspended. As soon as possible after the armistice Mr. Digby Grist returned to the problem and approached the Ministry of Agriculture for help. He was referred to the then existing Agricultural Organisation Society, who received him with open arms and helped him in every possible way. Chiefly through his efforts and the assistance of the A.O.S., Kent Wool Growers, Ltd., came into being in 1920. This Society set up its headquarters at Ashford, and there its business has been conducted ever since. Among individuals who greatly helped in the matter may be mentioned the late Mr. C. J. G. Hulkes of Tonbridge; Mr. H. W. Christie of the Agricultural Organisation Society; Mr. J. E. Quested of Cheriton, the well-known breeder of Kent sheep; Colonel J. Body, D.S.O., of Wittersham; Mr. H. F. Hukins of Tenterden; Colonel E. R. Wayland, C.M.G., of Monks Horton; Mr. T. Pilcher, senior, of Mersham; Mr. W. F. Wood of Cheke Court, Sittingbourne; and finally the late Mr. C. W. Ansdell of Messrs. Jacomb Hoare and Company, Woolbrokers, of London Wall, E.C. What Messrs. Jacomb Hoare have done for Kent Wool Growers and for other similar Societies can hardly be realised. The present writer gladly acknowledges that the success of Kent Wool Growers would have been impossible without their wholehearted assistance.

The Kent Wool Growers Society is run entirely by practical sheep breeders. This is an essential factor for the success of such an enterprise. Naturally the Society has met with a great deal of opposition from dealers. This opposition has, however, largely died down, and local dealers are now always among the bidders for the Society's wool when it is offered on the London Market. In this Market we have competition by buyers from all parts of the world; and that these buyers are satisfied is obvious from the fact that many of the same names reappear in the list of purchasers at one sale after another. There are still of course a good many farmers in Kent who are not members of the Society and who sell to dealers because they do not care to break old associations. Such an attitude is perhaps praiseworthy from some points of view, but it is not a business attitude.

The methods of Kent Wool Growers are shortly these. Any

grower who wishes to make use of the facilities which the Society offers must subscribe for at least one £1 share. He may, if he cares, take any number up to two hundred. The shares bear interest at five per cent. per annum, and this interest is a first charge on the wool handled. The member's liability is limited to the amount of his shareholding. The Society comes under the Friendly Societies Act and its accounts are audited annually by a well-known local firm of Chartered Accountants. A General Meeting of members is held each year at the beginning of the shearing season (usually about the middle of May), when the amount of the advance to be paid on delivery of the clip (which has previously been fixed by the Committee) is made public. About the beginning of May the Secretary sends out to every member a copy of the form reproduced below, upon which the member is requested to enter the preliminary information which the Society requires.

THE KENT WOOL GROWERS, LIMITED.

DEAR SIRS,

I beg to inform you that I wish to sell my Wool this year on the Co-operative system through the Society.

I expect to have total of about.....fleeces, as follows:—

KENT	.....
HALF-BREED	.....
LAMB'S	.....
.....

My Wool will be washed
unwashed (Please strike out word not required.)

Dates when I am likely to deliver my growth.....

Railway Station or Carrier empty sheets to be consigned to.....

Please supply me with the necessary sheets as soon as possible.

Signed.....

Address.....

Date.....

TO KENT WOOL GROWERS, LTD.,

DOVER PLACE,

ASHFORD, KENT.

N.B.—It is necessary to notify the Manager 2 or 3 days before sending your Wool. As expenses are largely increased by the congested arrival of Wool without previous notice, it would be of great assistance if producers could give 2 or 3 alternative days in which they could deliver their Wool.

Members are requested to note that no sheets can be issued on Tuesdays unless application is received by first post on that day.

No advances can be made after the Depot is closed.

So soon as the member returns this form the necessary sheets are dispatched to him carriage paid according to his instructions. Each sheet has a label attached, printed either in red (for washed) or blue (for greasy) wool. The grower is asked to insert, on its label, particulars of the contents of each sheet and to put his sheets on rail, or deliver them by road, on a pre-arranged day. He is asked to fix a day for delivery because experience has shown that unadvised arrivals cause delay, additional labour and avoidable expense. As soon as the wool arrives at the Depot it is weighed and if possible graded at once and put in the bins. If the consignment is not graded on the day of receipt a postcard giving the net weight is sent to the member. As soon as the wool has been graded a form is sent to the member giving the net and gross weight of the consignment, and the grading. When the wool has been sold, another copy of the same form is sent to the member, giving, in addition to the previous information, the price per pound received for each grade of wool, together with the total amount to be received after deduction of expenses. A specimen is reproduced on page 228.

As far as possible, in order to avoid double handling, the wool is graded on arrival. The grower's particulars of the number of fleeces are accepted as correct, but the grader has the last word as to whether the wool is to be described as washed or greasy. Many growers allow their sheep to go too long between washing and shearing; the grease then comes up again in the wool, and it cannot be graded as washed. Every grower loyally accepts the grader's decision. The authorised advance, which is usually about two-thirds of the value of the wool in May, is sent by the Society to the grower within one week of the receipt of his wool. No advance is made either on Locks or on dead wool.

As soon as possible after grading the wool is baled by means of a hand press, in exactly the same way as Colonial wool, and is stacked up ready for delivery after sale. A 25 per cent. sample is sent to the wool floor at London Docks, where it is open to inspection by buyers. In order to make this sample perfectly fair and representative every fourth bale that is packed is made a sample bale.

The London Wool Sales take place at various times throughout the year. The Committee then, after consultation with the Brokers, decide when the wool is to be offered for sale. They thus have the best expert advice regarding the value of the wool and the present and prospective demand for each particular grade.

The Society's wool is offered at the first favourable opportunity and as soon as possible after its sale the member receives a cheque for the amount due. By selling thus in the world's leading wool market under co-operative methods the small

Date July 12th 1929.

KENT WOOL GROWERS, LIMITED. ASHFORD, KENT.

Season 1929.

RECEIVING SLIP.

Name.....

Address.....

Sheets 2 No. of Bags 7 to be returned

Breed Kent & Dn. Washed/Greasy.....

No. of Fleeces 95

Owner's Count.

Sheet No.	Contents.	Cwt.	Weight, qrs. lbs.
990	75 Ewes	3	3 25
567	17 Ewes and 3 Dns.	1	0 25
4 Bags	Lamb's Wool	1	0 18
1 "	Locks		26
2 "	Broken Wool	2	13
Gross Weight		7	0 23
Draft and Tare			1 17
Net Weight		6	3 6

Signed F. C. J. Swainson I.B.

GRADING SLIP.

Grade.	Weight in lbs.				Price d. per lb.	£	s.	d.
Greasy Fleeces . . C 4				9	13½	2	16	1½
" " " " 6				4	13½	9	13	6
" " " " 7	1			7	11½	8	1	11½
" " " " 8	1			3	12		13	0
" " " " 12				7	13		9	3
" " " " 13				3	9½	1	14	0½
" " " " 15				4	12½	1	8	8½
" " " " 16				4	10	1	8	4
" " " " K 2				5	13½		5	8½
" " " " H D 1				2	14½		14	9
Broken Wool . . R 1				5	12½	3	6	4½
Lambs Wool . . T 2			1	2	13½	6	14	8
Locks . . P 1				4	11	1	2	0
Total ...			7	6		39	8	5½

Less Expenses @ 7 per lb. 2 15 6½

Less Advanced 33 13 0

Add Interest 5% ...

Cheque to Balance ...

SALE STATEMENT.

Price d. per lb.	£	s.	d.
	2	16	1½
	9	13	6
	8	1	11½
	13	0	13
	1	9	3
	1	14	0½
	1	8	8½
	1	8	4
		5	8½
		14	9
	3	6	4½
	6	14	8
	1	2	0
	39	8	5½
	36	8	6½
	2	19	10½
		5	0
	3	4	10½

farmer can secure the same advantages as the man who has several thousand fleeces to offer. The wool growers as a group can get all the advantages that are obtained by the Argentine grazier with regard to his beef or by the New Zealand dairy farmer with regard to his butter. The methods of marketing employed in these cases are triumphant examples of organisation and co-operation. The retailer is placed in the position that he can telephone to his agent and buy exactly the quantity of exactly the grade that he wants. He need not buy anything he does not want. Similarly the wool manufacturer can go to the Wool Market and buy as much as he wants of the exact type of wool that he requires for his particular business, and he is willing to pay something extra for this convenience.

Schemes similar to that existing in Kent are now in operation in New Zealand, Australia and the United States of America. In Messrs. Dalgety's review of November, 1928, reference was made to the increasing quantities of the smaller clips that are now being graded before sale, and offered in graded lots of 30 to 40 bales. They speak of the splendid competition which such lots command compared to small lots of mixed quality. This has been the experience of the writer with regard to English wool. Instead of selling to local dealers or at local auctions, with their cramped competition, the Kent Society caters directly for the consumer, and is gradually getting together a large clientele of overseas buyers who help in the most efficient way to bring English wools to their proper value. English wool has never been properly appreciated until Kent Wool Growers began to offer it, as it should be offered, on the London Market.

It will be seen from the table (page 230), compiled by Major Orme, D.S.O., of the Ministry of Agriculture, that the Kent Society has increased in membership every year since it started. This is the best evidence that its members are satisfied with the services rendered by it and with the methods which it employs. Mr. Digby Grist and Mr. H. W. Jacomb of Messrs. Jacomb Hoare and Company are still serving on the Committee.

While many farmers are against co-operative wool sales, or at least are not making use of this method of marketing, it cannot be denied that the mere existence of Kent Wool Growers has raised the price of wool in Kent, especially in the case of Lamb's wool and Locks. This rise applies to outsiders as well as to members of the Society. It may be safely asserted that the recent slump in wool values, so far as Kent is concerned, would have been far more severe but for the existence of the Society.

What has been done in Kent in regard to co-operative wool marketing can be done elsewhere equally well. Indeed other

MARVELLOUS GROWTH OF KENT WOOL GROWERS, LTD.

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
MEMBERS. 75	101	165		407	501	705	765	824	1,021	1,112	1,145	1,170
CAPITAL. £611	£688	£894	£1,517	£1,813	£2,201	£2,298	£2,399	£2,723	£2,913	£2,954	£2,987	
FLEECES. 25,000	45,000	95,000	120,000	163,000	164,000	209,000	204,000	194,000	174,000			
NETT SALES VALUE. £12,500	£8,900	£16,501	£51,617	£74,418	£71,888	£70,727	£83,212	£127,348	£82,350	?		?
OVERHEAD CHARGES PER LB. 1½d.	1½d.	1½d.	1d.	1d.	1½d.	1½d.	1½d.	1½d.	1½d.	?		?

The N.F.U. Kent County Executive Committee have adopted the recommendation of its Marketing Committee that the Kent Wool Growers, Ltd., should be heartily supported by members of the Kent Branches.

Societies on similar lines have been started at Chichester, Ipswich, Banbury and Stamford.

F. C. J. SWAINSON.

Ashford,
Kent.

A CENTURY OF WAGES AND EARNINGS IN AGRICULTURE.

It is now more than 130 years since the "pore Laborers of Feltwell Parish" gave notice to their employers that they would not continue at work for less than 2s. a day. If they could not secure this wage, they were prepared "to proceed further in it" and "to make it a General thing in the parish, both Single & Married, all that belong to the parish."¹ This is probably the earliest threat of a strike in agriculture on record, and it is not without interest that the scene is laid in Norfolk. Evidence of wages and of earnings before the early years of the nineteenth century is scanty. Moreover, the proportion of wage-labourers in the agricultural population was much lower in the days before the inclosure of open fields, the engrossment of holdings and the growth of capitalist agriculture. With the decline of subsistence farming and the development of farming for profit, the number of farm workers as contrasted with farmers steadily increased. Since then, and at all times within the last hundred years and more, agriculture, if it has had an easier passage than that which has to be recorded of urban industries, has not been wholly free from the difficulties which surround the allocation of net returns between capital, management and labour. The displacement of labour consequent on the introduction of the early agricultural machines was accompanied by the damage to property which characterised the introduction of machinery in industry. If the unregulated employment of women and children on the land continued long after its control by Parliament in the factory and the mine, the Factory Acts had ultimately their agricultural counterpart in the Gangs Act. If the difficulty of organising a scattered industry such as agriculture made it hard to proceed to the last resort of the dissatisfied urban worker, the strike, farming has not altogether escaped this manifestation of misunderstanding between employers and employed. And, most recently, State intervention to regulate the wage-bargain, first exercised on certain ill-organised industries by way of the Trade Boards, was later to find its rural counterpart in the creation of the Agricultural Wages Board. Agriculture has lagged behind

¹ From a letter in the possession of Mr. B. Halliday, Leicester.

in all these experiences and changes, as a traditional industry was bound to do, but as national enterprise became more and more industrialised during the nineteenth century, it was impossible for farming to maintain a different standard in the relations of employer and employed, and labour conditions in agriculture to-day vary but little from those in any other of the nation's industries. Wages may be fixed by statutory boards instead of by collective bargaining; hours of labour settled by the same authorities instead of by Act of Parliament or again by collective bargaining. And if the relative steadiness of agricultural employment has led to the exclusion of farming, so far, from a piece of social legislation so far-reaching as unemployment insurance, there is still, in effect, a pronounced tendency to assimilate the relations of employer and employed in agriculture with those of industry in general.

As a result, a position has been reached to-day in which it is claimed that the regulation of conditions of employment is proceeding without any relation to the labour charge that the industry can bear; in fact, that in the distribution of the net returns of farming to-day, the worker is taking an undue proportion. It may be of interest, therefore, to review the course of wages and earnings during the past hundred years or so, tracing the changes in the economic position of the farm worker from the early years of last century up to the present time.

All through the nineteenth century, the condition of the agricultural worker has been a subject of study, both by public and by private enquiries. In the present century, too, there have been public investigations of the wages and conditions of the farm labourer, so that there is no lack of evidence on the subject. On the contrary, the abundance of it makes it difficult to marshal the facts, for they do not adapt themselves to tabular expression, nor do they lend themselves to easy generalisations. "Agriculture" is the generic title given to a variety of industries, and the income from each divisible amongst capital, management and labour varies with the special conditions of each, which may be favourable or otherwise to their relative profitability. And the agricultural labourer is not a specialist in the modern industrial sense of the word, but rather has he a diversity of functions, so that it is difficult to assess the specific productivity of his labour. These factors, however, are disregarded in the main in the assessment of the labourer's worth, and employment in different branches of agriculture, or variety of employment within the same branch of agriculture, has never been differentiated in farm wages. In the following review, therefore, the aim is to summarise the general tendencies of wage-rates in the last century, and to consider particularly the cost of living and the standard of life of the agricultural worker since the year 1918.

WAGES IN THE NINETEENTH CENTURY.

Figures of wages and earnings in agriculture are available for a series of years in the last century, and most of the data has been collated by Professor Bowley.¹ His figures for the nineteenth century begin with the Commission on Wages and Poor Rates, 1824, and are carried on by various commissions and enquiries at irregular dates up to Mr. Little's report on the Agricultural Labourer in the Report of the Royal Commission on Labour, 1892. Thus, they do not include the valuable evidence collected by Mr. Wilson Fox on the Wages, Earnings and Conditions of Employment of the Agricultural Labourers, published in 1898. From one source or another sufficient figures are available to give the rates of wages at various dates in the counties of England, grouped together as follows :—

- Division 1.* Cumberland, Westmorland, Northumberland, Durham, Yorkshire, Lancashire, Cheshire.
- Division 2.* Derby, Nottingham, Lincolnshire, Rutland, Leicester.
- Division 3.* Warwick, Worcester, Stafford, Shropshire, Hereford, Gloucester.
- Division 4.* Somerset, Cornwall, Devon, Dorset, Wiltshire.
- Division 5.* Cambridge, Bedford, Huntingdon, Northampton, Hertford, Buckingham, Oxford.
- Division 6.* Hampshire, Sussex, Kent, Surrey, Middlesex, Berkshire.
- Division 7.* Essex, Suffolk, Norfolk.

TABLE I.

WEEKLY CASH WAGES OF AGRICULTURAL LABOURERS IN THE NINETEENTH CENTURY.

Autho- rity	Year	Div. 1		Div. 2		Div. 3		Div. 4		Div. 5		Div. 6		Div. 7		Aver- age
		s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	
<i>a</i>	1824	11	6	10	3	8	10	7	8	8	4	10	1	8	11	9 6
<i>b</i>	1833	11	1	12	3	9	8	8	9	10	4	11	10	10	4	10 8
<i>c</i>	1837	12	2	11	6	9	7	8	1	9	3	10	8	10	4	10 3
<i>d</i>	1850-51	12	2	10	1	8	4	7	9	8	8	9	1	7	10	9 7
<i>e</i>	1860-61	12	3	12	6	10	4	9	7	10	7	11	10	11	1	11 7
<i>f</i>	1867-71	15	1	13	4	11	4	10	6	11	7	11	8	11	0	12 5
<i>g</i>	1879-81	16	2	14	5	13	4	12	4	13	0	13	10	12	6	13 9
<i>g</i>	1892-93	16	5	15	2	12	0	11	8	12	4	12	10	11	10	13 4
<i>h</i>	1898	16	10	16	2	13	10	12	7	13	0	14	10	11	11	14 5

AUTHORITIES.

- a.* Commission on Wages and Poor Rates, 1824.
- b.* Poor Law Commissioners, 1834.

¹ Bowley, *Wages in the United Kingdom in the Nineteenth Century.*

- c. PURDY, "Earnings of Agricultural Labourers," *Journal of the Royal Statistical Society*, 1861.
- d. CAIRD, *English Agriculture in 1850-51*.
- e. "Returns of Wages, 1830-36" and "Returns of Agricultural Wages, 1860-61 and 1869." HASBACH, *English Agricultural Labourer*.
- f. See e.
Commission on the Employment of Women and Children in Agriculture, 1867-9.
 KEBBEL, *The Agricultural Labourer*.
 DEUCE, *Journal of the R.A.S.E.*, 1885.
- g. LITTLE, *Royal Commission on Labour; the Agricultural Labourer*, Vol. 5, Pt. 1, 1894.
- h. WILSON FOX, *First Report on Wages, Earnings and Conditions of the Agricultural Labourers*, 1898.

It must be noted that these figures represent only cash wages, and taking the average figures for all groups, the immediate conclusion is that the farm labourer's gain in cash wages over a period of 74 years was just about 5s., representing roughly a 50 per cent. increase in his money income in the year 1898 over the year 1824. A closer inspection of the Table, however, shows that this gain was by no means regular, either over the country as a whole or in any of the various divisions. Considering the whole country, it will be seen that cash wages rose until 1833, and then remained more or less stationary until the year 1850, when, according to Caird's figures, they were scarcely higher than in the year 1824. From the 'fifties until the 'eighties, however, coincident at first with the general rise in the prosperity of agriculture but, towards the finish of the period, outlasting it, wages rose again. The agricultural depression had but little effect upon the labourer's cash position, for although there was a slight decline in wages up to the year 1893, which marks almost the bottom of the depression, they rose again from that point, and the end of the century saw the farm worker in a stronger financial position than he had ever known.

The causes to which these events may be ascribed call for some consideration. Taking the 'twenties as the starting-point, readers of Cobbett will call to mind at once the vivid picture of the agricultural distress of the time, painted, as usual, by him in striking colours. The picture is confirmed by Professor Clapham's history of the period, recounting the collapse of the high prices for corn which had followed the defeat of Napoleon, aided by the poor harvests of 1826, 1828 and 1829.¹

To these causes of farming adversity and consequent low wages was added that arising from the growing numbers of the wage-labourer class. It was this period that witnessed the culmination of the inclosure movement, a by-product of which was the increase in the numbers of landless men. And then,

¹ J. H. Clapham, *Economic History of Modern Britain; The Early Railway Age, 1820-50*.

as now, things tended to move in a vicious circle, for the low wages and distress amongst the farm workers called for remedy, and the remedies adopted served only to add to the burdens of agriculture. The most popular measure of assistance had been that which has become known as the Speenhamland Act. The practice to which this refers arose in Berkshire, where the Justices of the Peace decided in Quarter Sessions, at Speenhamland, that if farmers and others would not increase the pay of their labourers, they would make an allowance, based on the price of bread, to every family in proportion to its numbers. The cost, of course, was met out of the rates, and the result was to pauperise labour. The more idle and improvident a man was, the more relief he obtained. Nevertheless, the system became very popular, particularly in the southern and eastern parts of the country, and by the end of the 'twenties, the burden of the rates, added to the fall in prices and the maintenance of rents, brought about a severe depression in agriculture.

The industry, then, was disturbed by plenty of internal troubles. The labourer too had his difficulties to face, for wages, which seem to have risen between 1790 and 1814, began thereafter to fall with the fall in wheat prices. In the Isle of Ely, for example, winter wages ranged from 12s. to 15s. in 1813, while in the 'twenties they were no more than 9s. to 10s. a week.¹

Another cause operating to keep wages low was the working of the old Poor Law, and associated with it the Laws of Settlement. By the former, Poor Law authorities had become definite participants in the wage system in agriculture, by the adoption of the bread scale, or a guarantee by the parish of a weekly income to the agricultural labourer's family, fixed in terms of bread prices, as indicated above. As an early example of a minimum wage, it had very little to recommend it. Not merely did it keep a redundant supply of labour upon the land, but it placed the burden of the cost of labour upon the parish rather than upon the farmers employing it. Thus, it tended to subsidise the larger farmer at the expense of the one employing little or no labour, who was sometimes driven out of farming from the combination of causes, to increase the already swollen labour force.

The Laws of Settlement operated to immobilise labour, for they made it risky for the worker to seek employment in another parish. The Report of the Select Committee on Agriculture in 1833, suggests that the tendency of these laws was "to prevent the free circulation of labour, to chain it to the spot where it was not wanted, and to check its natural flow into the place where it was required." It was impossible to receive relief anywhere except in the parish of birth. This may have removed

¹ Clapham, *op. cit.*

one of the checks to the mobility of labour, in that the parish would view young immigrant labourers with little alarm, but it had the painful reverse side, in that old and infirm industrial workers, becoming chargeable to the rates, had to be sent back to the country parishes from which as young people they had migrated.

However, there were other factors at work in other parts of the country which brought about considerable differentiation in wage-rates. Bowley's recapitulation of the findings of the 1824 Commission shows that weekly wages were highest in the northern counties, and lowest in the south-western counties. The range between the averages for these groups was 4s., and by the end of the century the difference had risen to 5s. In the series of Tables II to VIII, the individual county variations in cash wages over the period 1824 to 1898 are shown.

TABLE II.

WEEKLY CASH WAGES IN CUMBERLAND, WESTMORLAND, NORTHUMBERLAND, DURHAM, YORKSHIRE, LANCA-SHIRE AND CHESHIRE.

Year	Cumber- land	West- morland	North- umber- land	Durham	Yorkshire	Lanca- shire	Cheshire
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
1824	12 0	—	11 3	11 6	(12 5 W. 11 6 E. 10 3 N.)	12 6	10 6
1833	10 8	11 0	11 5	11 0	(11 5 W. 11 0 E. 11 4 N.)	12 2	9 10
1837	12 0	12 0	12 0	12 0	12 0 (W. E. N.)	—	13 0
1850-51	13 0	—	11 0	11 0	(14 0 W. 12 0 E. 11 0 N.)	13 6	12 0
1860-61*	13 6	15 0	14 0	14 3	(13 6 W. — E. 13 8 N.)	13 6	12 3
1867-71*	14 9	16 1	16 7	16 0	(16 5 W. — E. 15 4 N.)	15 0	13 6
1879-81	18 0	—	17 0	—	(16 6 W. 15 0 E. 16 6 N.)	17 6	12 6
1892-93	18 0	—	17 0	—	(16 0 W. 15 6 E. 15 6 N.)	18 0	15 0
1898	17 0	17 0	17 0	18 0	(16 4 W. 15 4 E. 17 0 N.)	18 1	16 2

TABLE III.

WEEKLY CASH WAGES IN DERBY, NOTTINGHAM, LINCOLN-SHIRE, RUTLAND AND LEICESTER.

Year	Derby	Nottingham	Lincolnshire	Rutland	Leicester
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
1824	10 9	10 3	10 0	—	10 0
1833	12 0	12 10	13 4	12 2	11 2
1837	12 0	12 0	12 0	—	10 0
1850-51	11 0	10 0	10 0	—	9 6
1860-61*	12 0	13 1	13 8	11 9	12 8
1867-71*	13 10	13 2	14 0	12 4	13 1
1879-81	16 6	14 0	13s.6d.-15s.0d.	—	13 0
1892-93	16 0	15 0	14s.3d.-15s.0d.	—	15 0
1898	18 2	16 7	14 10	15 2	15 2

TABLE IV.

WEEKLY CASH WAGES IN WARWICK, WORCESTER, STAFFORD, SHROPSHIRE, HEREFORD AND GLOUCESTER.

Year	Warwick	Worcester	Stafford	Shropshire	Hereford	Gloucester
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
1824	9 0	8 0	10 6	9 0	7 0	9 3
1833	10 10	9 6	11 1	9 2	8 1	9 6
1837	10 0	9 6	12 0	9 0	8 0	9 0
1850-51	8 6	—	9 6	—	—	7 0
1860-61*	10 11	10 0	12 3	10 4	9 5	9 6
1867-71*	12 7	11 9	13 0	11 6	10 1	11 1
1879-81	14 3	13 0	14 6	13 3	11 9	13 3
1892-93	11 6	12 0	16 0	14 0	11 0	10 6
1898	14 8	14 2	15 5	14 1	12 8	12 0

TABLE V.

WEEKLY CASH WAGES IN SOMERSET, CORNWALL, DEVON-SHIRE, DORSET AND WILTSHIRE.

Year	Somerset	Cornwall	Devonshire	Dorset	Wiltshire
	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>
1824	8 0	8 3	7 6	7 0	7 6
1833	8 6	8 11	9 0	8 2	9 1
1837	8 8	—	8 0	7 6	8 0
1850-51	—	—	8 6	7 6	7 3
1860-61*	9 8	10 0	9 4	9 9	9 6
1867-71*	10 5	11 0	10 2	10 1	10 7
1879-81	12 6	13 9	13 0	10 9	11 9
1892-93	11 0	14 0	13 6	10 0	10 0
1898	12 10	12 11	13 8	11 8	11 9

TABLE VI.

WEEKLY CASH WAGES IN CAMBRIDGE, BEDFORD, HUNTINGDON, NORTHAMPTON, BUCKINGHAM, HERTFORD, OXFORD.

Year	Cambridge	Bedford	Huntingdon	Northampton	Buckingham	Hertford	Oxford
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1824	9 0	8 6	7 6	8 0	8 3	9 0	8 0
1833	10 6	10 0	10 5	10 3	10 2	11 0	10 1
1837	9 6	9 6	9 6	9 0	9 6	9 6	8 6
1850-51	7 6	9 0	8 6	9 0	8 6	9 0	9 0
1860-61*	10 6	10 11	10 11	11 3	—	10 0	—
1867-71*	11 0	12 3	12 0	11 10	—	12 7	—
1879-81	13 6	12 6	12 6	13 6	12 9	13 6	12 9
1892-93	12 0	12 0	13 0	14 0	12 0	11 6	12 0
1898	12 4	12 11	12 11	14 5	13 4	12 11	12 1

TABLE VII.

WEEKLY CASH WAGES IN HAMPSHIRE, SUSSEX, KENT, SURREY, MIDDLESEX AND BERKSHIRE.

Year	Hampshire	Sussex	Kent	Surrey	Middlesex	Berkshire
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1824	8 6	9 6	11 9	10 8	11 3	8 9
1833	10 2	12 1	13 1	12 0	13 0	10 5
1837	9 6	10 7	12 0	10 6	—	—
1850-51	9 0	10 6	—	9 6	—	7 6
1860-61*	11 3	11 6	12 9	12 7	—	10 9
1867-71*	10 10	11 10	14 0	13 6	—	10 2
1879-81	12 0	13 6	15 9	15 6	—	12 3
1892-93	11 6	12 0	14 6	15 0	—	11 0
1898	12 8	14 2	16 4	15 7	17 0	13 1

TABLE VIII.

WEEKLY CASH WAGES IN ESSEX, SUFFOLK AND NORFOLK

Year	Essex	Suffolk	Norfolk
	s. d.	s. d.	s. d.
1824	9 4	8 3	9 2
1833	10 3	9 11	10 9
1837	10 4	10 4	10 4
1850-51	8 0	7 0	8 6
1860-61*	11 9	11 11	10 6
1867-71*	11 5	10 10	11 4
1879-81	12 6	12 6	12 6
1892-93	11 6	12 0	12 0
1898	12 7	11 5	11 10

* For these two periods, only the statistics given by Little in his report to the Royal Commission on Labour, 1894, are used.

Table I has made it apparent that the south-eastern counties of England, together with those north of the Wash, enjoyed a weekly wage higher than the average for the whole country, while the remaining counties fell short of the average to the extent even of half a crown a week in Hereford and Dorset. The difference in wage-rates in different parts of the country may be ascribed to three causes. By the year 1824, the Industrial Revolution had already altered the distribution of the economic forces of the country. The northern counties, so long divorced by distance from suitable markets, now found a new demand for their products close at hand. The rapid development of the factory system, concentrating population around the coal measures, caused a growing demand for food, which assured to farmers in and around the districts concerned a more stable market than that enjoyed by those in the south. At the same time, the growth of London had a similar effect upon wages in the south-eastern counties.

Not only did the growth of industry and commerce at this time increase the demand for food, it increased the demand for labour. Clapham says "most of what were to become the largest English towns had grown more rapidly between 1821 and 1831 than they were ever to grow again."¹ While this growth came about largely by natural increase supplemented by Irish immigration, the pull of the town upon the countryside was already making itself felt. Thirdly, as has been noted already, the Speenhamland policy of Poor Law administration was in operation much more in southern England than in the north. The reasons for this were various. The fact that industrial conditions in the north were making for higher wages made recourse to that policy less necessary. In addition, the practice of living-in by the young unmarried farm servants was widespread then and for long after in the north, though in the south the development and expansion of large-scale farming had brought about the increase of the day labourer, in the place of the farm servant living with his master. As Hasbach puts it, "the high prices (of the war period) transformed the farm servants into labourers, hired for some considerable period; the low prices changed the day labourers into paupers."² Where day labour was important, there the Speenhamland policy, with its depressing effect on wages, was in full swing.

This, then, was the position of agricultural labourers in the 'twenties. By a combination of circumstances profoundly disturbing to the agricultural industry of the time, weekly cash wages had been driven down to a low level, and the improvement made during the war years had once more been lost.

¹ *Op. cit.*, p. 536.

² *Op. cit.*, p. 187.

It is important, however, to note that so far all references have been to cash wages. To what extent had the standard of living been affected by these events? Weekly wages, then, as now, do not tell the whole story. There were extra cash earnings, for example, at harvest, which were important, and perquisites and allowances in kind added to the annual income. Against these must certainly be placed the loss to the labourer in many parishes of rights of common which were ceded on inclosure, and very often a want of adequate cottage gardens. Cobbett's dictum was—"Invariably have I observed that the richer the soil and the more destitute of woods, that is to say, the more purely a corn country, the more miserable the labourers . . . he has not a stick of wood and has no place for a pig or cow to graze."¹ The northern counties, which experienced less of the practice of engrossing farms, were still able to provide some of these facilities.

The potato patch was rapidly coming to the fore in the 'twenties. It was generally provided in the fields, and a good rent was usually charged for it. The potato had not been an important article of diet in the eighteenth century, but by the end of the third decade of the nineteenth century its consumption amongst farm labourers was widespread, and it added a certain stability to their diet.

Eden's judgment on the diet of the people at this time was unfavourable. In the southern counties food was monotonous—"the unvarying meal of dry bread and cheese from week's end to week's end," while "the deleterious produce of China afforded their most usual and general beverage." His picture of the working man's diet in the northern counties points to a distinctly higher standard, among other things enumerated being porridge, eaten with treacle or buttermilk, oatcake, barley bread, soup and potatoes. Clapham, from whom this evidence is quoted, quotes also the reply of a witness before the Select Committee on Agriculture, 1821, who made the rather surprising assertion that few labourers did not get some meat every day.²

All things considered, it may be said that at this time farm labourers in the southern half of the country were more dependent on their weekly cash earnings than heretofore, that wages had been slow in following rising prices, but tumbled down when prices fell, that the bread scale of the Poor Law administration supplied a minimum of subsistence, and that family earnings which had been supplemented by the practice of home industries, had declined with the growth of factories. In the northern counties, ruling wages were higher because agricultural products more remunerative than corn were being grown, and the labourer was better off to the extent that cottage gardens were more

¹ *Rural Rides*, p. 321.

² Clapham, *op. cit.*, p. 118.

general. Added to this, the farm servant boarded by his employer escaped the irregularities of employment and fared well.

So much for the farm labourer in the 'twenties of last century. His position and the conditions bearing upon it have been dealt with at some length, for this period marks the peak of the change from the older types of agriculture and the traditional relationships of master and man, to farming for the market and for commercial profit. In the changes that have taken place subsequently, four periods may be distinguished :—

- (i) From the period of the 'twenties to the year 1850.
- (ii) The period 1850 to 1874.
- (iii) From the year 1874 to the end of the century.
- (iv) The present century.

(i) FROM THE PERIOD OF THE 'TWENTIES TO THE YEAR 1850.

The economic position of the agricultural labourer was affected by two outstanding events during this period. The first was the new Poor Law of 1834 ; the second was the repeal of the Corn Laws in 1846.

The Poor Law Amendment Act, 1834, reduced out-relief to a minimum, and the practice of subsidising wages disappeared. As a result, able-bodied men and married men were hit in two ways. Subsidised wages had led to the maintenance of a surplus of labour on the land at a low wage. It might have been expected that with the withdrawal of the out-relief subsidy there would be some rise in wages, as seems to have happened, but this upward tendency was countered by the over-supply of labour. Emigration provided some solution, aided, no doubt, by what Malthus described as the "natural checks" to increase in population, while the new Poor Law itself discouraged the improvident marriages of which so much is heard before it was enacted. Each of these remedies, however, was slow in action, and there never seems to have been any complaint of the shortage of labour.

Again, the supply of labour for the land was being augmented from another source, under the operation of the Poor Law Amendment Act. While it had always been customary, so far as can be ascertained, for women and children to work in the fields, the wage subsidies under the old Poor Law sufficed to keep many of them at home. Now, however, the family income had fallen without a compensating rise in wages, and so the labourer sent his family into the fields to earn what it could. That the low pay earned by their work undercut the value of his own labour did not strike him. He was only concerned that they should add something to his own inadequate earnings, and the more

he was threatened with irregularity of work or even unemployment, the more dependent did he feel himself to be upon their earnings.

The repeal of the Corn Laws was not at once reflected in prices or wages, but directly a fall in the cost of provisions occurred, wages were lowered in conformity therewith. Purdy's figures for 1837 show an average wage of 10s. 4d.; Caird's figures for 1850-51 put the average for England at 9s. 7d. Moreover, Caird puts the fall in the cost of living between 1840 and 1850 at 30 per cent.

Within this general movement, particular changes are to be noted. Caird found that the areas most affected by the advent of free trade were the south and the east, where the bulk of corn-growing for the market was concentrated. In the northern counties, where the commodities produced were less affected by the repeal of the duties, and where the industrial market was always growing, wages were 37 per cent. higher than in the south. Between east and west, too, the contrast was marked, following the difference in farming practice, and Caird summarises the variations in the labourer's cash wage in the different quarters of the country as follows:—

Average Wage Rates in 1850-51.¹

	<i>s. d.</i>
Northern Counties	11 6
Southern Counties	8 5
Western Counties	10 0
Eastern Counties	9 1

Once again it is necessary to try to determine how far the fall in wages represented the fall in the standard of living. Certainly it did where the competition of women and children and the introduction of machinery led to a surplus of labour and to unemployment. On the other hand, Caird's calculations show that the economic lag was operating in favour of the worker, and the cost of living was falling faster than wages. Clapham quotes Professor Silberling's figures showing that, taking the prices of 1790 as the base year, the cost of living fell from 113 per cent. in 1824 to 83 per cent. in 1850.² That there was much misery in some parts of the country, leading to disaffection manifested in rick-burning and in other ways, is a matter of history, but the economic position of the man in regular employment on the land seems to have been at least as good in 1850 as it was in 1824. Irregularity of employment rather than a reduction of the standard of reward for work done was probably the real grievance.

¹ Caird, *op. cit.*, p. 510.

² Clapham, *op. cit.*, Appendix.

(ii) THE PERIOD 1850 TO 1874.

This was a period of prosperity of farming, and it had its reflection in the lot of the farm worker. There was a cycle of good harvests; railways linked all parts of the country together, breaking down the local character of much of the agriculture, whilst poor communications with other countries protected the farmer from any strong current of overseas competition. In the early part of the period under review, the Crimean War had stimulated prices, while in the years of peace that followed England alone among the greater powers offered a growing market to her farmers. The prosperity of industrial workers increased the demand for foodstuffs, especially meat and butter; the Californian gold discoveries effectively stabilised rural prices; England had become the workshop of the world.

During the period, farm workers' cash wages advanced about 3s. weekly in all parts of the country, but the marked distinction between the different parts still remained. Thus, while the average wages for the country were 12s. 5d., the southern counties hardly came within a shilling of this, while in Northumberland and Durham wages topped 16s.

The determining factors in these district variations were the same as those already noted in the earlier period. In addition, the expansion of urban industry and its localisation in the Midlands and north provided farm workers in those parts with alternative employment, while such domestic industries as still existed in the southern half of the country were dying out.

Moreover, the distribution of rural labour was subject to influences other than those economic, some of which have been noted already. In the north, the supply was small; in the south was an over-supply, complicated by the employment of women and children. The farm servant, hired for the half-year or the year and receiving wages and board irrespective of weather or sickness, was a prevalent type in the north; the day labourer, stood off when not wanted, was typical of the south. In the east, large-scale farming and machinery exaggerated the seasonal demand for labour, calling into being the gangs required only at certain periods. In the south-west, the redundant population kept the workers' wages low.

A factor affecting the standard of living was the distribution of allotments. According to Ashby, there was a considerable extension of the amount of land under allotments from the year 1850 onwards. Owners of small fields took advantage of the demand for land and let them in small parcels at increased rents. Owners of large estates sometimes provided field gardens or larger allotments for the labourers. Thus, in 1867, there were over 900 allotments on the Duke of Marlborough's Oxfordshire

estate.¹ Allotments were more general in the southern half of the country. In the north, the farm servant living in had no need of one, and the larger allowances in kind reduced the necessity. Opinions differed, and still differ, upon the purely economic aspect of allotments and whether they were, in part, a cause of the lower wages in the south. But be that as it may, they were much sought after as a means of securing a valuable addition to the family food supply.

(iii) FROM THE YEAR 1874 TO THE END OF THE CENTURY.

The period now to be considered is one that experienced greater changes in agriculture, probably, than any of the century. By the end of it, the system of farming over large areas of the country had undergone a revolution, the value of the landlords' capital all over the districts of arable farming had been halved, and their tenants had experienced losses of a similar order. Notwithstanding these severe reverses to the senior partners in the industry, the cash position of the agricultural worker improved.

Important changes in the condition of farm labour were introduced at the outset of the period under consideration. The Royal Commission on the Employment of Women and Children had reported in 1867, and its findings were reinforced by the passing of the Gangs Act in the same year, and of the Elementary Education Act of 1870. The Gangs Act imposed restrictions on the employment of women and children in gangs, which led ultimately to the break-up of the system. The Elementary Education Act made it compulsory for children up to the age of thirteen to attend school.

The general result was, quite definitely, to reduce family earnings. Farmers might attack the Education Act on the ground that the withdrawal of child labour added to costs of production, but the labourer was no less severely hit, though it soon became apparent that it might lead to increased opportunities for work for himself.

Before anything had happened to bring about any material change in wages from these causes, there came the first adventure in agricultural Trade Unionism. The immediate response to Joseph Arch's oratory was great, and for a time the organised labourer was able to obtain a higher wage. The Union was particularly strong in East Anglia; at no time was it any force in the north. The struggle between farmers and farm workers came to a head in 1874, and the Union was routed, nor did it ever regain its position. Internal dissension and the long years of the agricultural depression which soon set in, reduced its

¹ A. W. Ashby, *Allotments and Small Holdings in Oxfordshire* p. 17.

membership, and Arch himself came to stress emigration as the remedy for the workers' condition rather than the strike.

These events of the early 'seventies did a good deal to introduce a new relationship between master and man. It is probable that commercial farming had already done much to break the almost patriarchal system of olden days; after this time it vanished almost entirely, being replaced by the normal industrial relationship. The Report on the Decline in the Agricultural Population¹ points out that the farmer's demands upon his man were made from this time with an ever-increasing insistence upon the labour bill. Efficient workmanship was demanded; odd jobs that once provided a few shillings for the less able, were worked into the routine of the farm; the increasing use of machinery tended to weed out the unskilled.

But despite the set-back to the Union, and notwithstanding the agricultural depression, wages made a definite advance in these thirty years. The most general cause was, without doubt, the movement of rural workers into urban industry. Between the years 1871 and 1901, the migration amounted to some 300,000. In the corn-growing districts, the migration was necessary owing to the declining demand for labour, with the result that wages in Essex, Norfolk and Suffolk, for example, did not rise more than 1s. per week in the thirty-year period under review. But in the midlands and north, labour was being attracted into industry rather than driven from agriculture, to the extent that farmers had to pay higher wages if they were to retain an adequate labour force.

Considering now the total earnings of farm labour, estimates are in existence for the years 1867-70, 1892 and 1898. These are given in the table below, the division of the country into county groups being the same as that already adopted (see page 233).

TABLE IX.
WEEKLY EARNINGS OF AGRICULTURAL LABOURERS.

Year	Div. 1		Div. 2		Div. 3		Div. 4		Div. 5		Div. 6		Div. 7	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1867-70	17	7	15	1	13	4	12	4	14	2	15	8	14	6
1892	19	2	16	10	15	3	14	9	15	0	15	5	15	3
1898	19	1	18	6	16	7	15	8	15	9	17	11	14	10

For the first two periods, the estimates are those contained in Little's Report to the Royal Commission on Labour; for 1898, Wilson Fox's figures in his First Report are quoted. It is seen that gains of varying amounts were made, the average of all

¹ Cd. 3273. 1906.

districts being 2s. 3d. a week for the whole period. In the eastern counties, however, the average gain was no more than 4d. per week, and the intimate connection between the prices of arable products and the rate of wages at this time is clearly seen. On the other hand, the increasing demand for live-stock products from the districts more predominantly grassland in the midlands and the western and northern counties, is also reflected in the greater increase of earnings.

The analysis made by Wilson Fox of perquisites and allowances shows that these were not equal in all counties but tended to be larger both in substance and in value in those counties where wages were lowest. In Division 1, comprising Cheshire, Lancashire and Yorkshire, and all those north of them, and in Division 2, comprising the midland group of Derby, Nottingham, Lincoln, Rutland and Leicester, the difference between wages and earnings were 2s. 3d. and 2s. 4d. respectively. In Division 4, the south-western counties, the difference was more than 3s., and in Division 7, the eastern counties, the difference was 2s. 11d. But allowances did little to even up wages between districts. The greatest increases had taken place in the midland, western and south-western counties, followed by the northern counties, whereas Essex, Suffolk and Norfolk showed a rise between 1867 and 1898 of only a few pence.

But another factor was at work during this period besides changes in wages and earnings. The farm worker had also benefited by the rise in the value of money which characterised the period of the agricultural depression. The index of wholesale prices fell 55 points between the years 1873 and 1893, and the index for the group comprising food, drink and tobacco fell 51 points in the same period. There is no cost-of-living index for the agricultural worker at this time, for Silberling's index stops at 1850. But if the changes in the index of wholesale prices be used as a guide, it appears that the real wages of the farm worker in the year 1898 (that is to say, the value of his allowances and his cash wages expressed in terms of the purchasing power of money at this date) were 30 per cent. higher than in 1873. Further, his position was definitely better at this date relative to that of the landlord and the farmer. The Royal Commission on Agriculture in 1894 found that the ratio of wages to the total sum divided between the owner, the occupier and the labourer, rose from 36 per cent. in the years 1875-81, to 55 per cent. in the years 1889-95. The comparison may be weighted somewhat against the farm worker, for the latter period includes the worst years of the agricultural depression, but the figures provide some indication of the fortune of the three parties to the agricultural industry in the last three decades of the nineteenth century.

(iv) THE PRESENT CENTURY.

(a) 1900-1914.

Notwithstanding the improvement in the position of the farm worker, both in cash wages and in purchasing power, at the end of the nineteenth century, there were few people to assert that he was well off. For the next period, the year 1900 until the outbreak of the Great War, estimates of wages and earnings were made at four different dates, with results that are given in the tables below. For purposes of comparison, the table of cash wages (only) has been continued until the end of the four years of war.

TABLE X.
WEEKLY CASH WAGES OF AGRICULTURAL LABOURERS
FROM 1902 TO 1918.

Autho- rity	Year	Div. 1	Div. 2	Div. 3	Div. 4	Div. 5	Div. 6	Div. 7	Range
		<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d. s. d.</i>
<i>a</i>	1902	18 0	18 9	13 10	13 3	13 7	15 4	12 11	12 11-18 0
<i>b</i>	1907	17 3	18 3	14 8	13 8	13 11	15 9	12 10	12 10-17 3
<i>c</i>	1914	22 8	16 7	15 8	14 8	15 7	17 4	15 10	14 3-22 8
<i>c</i>	1917	23 10	25 10	21 10	19 7	22 2	23 0	23 11	21 10-23 10
<i>c</i>	1918	31 10	28 7	24 5	24 0	26 0	26 11	25 10	24 0-31 10
<i>c</i>	(Winter) 1918 (Av. Jan.)	38 2	—	24 3	23 10	25 9	25 7	25 4	23 10-38 2

TABLE XI.
WEEKLY EARNINGS OF AGRICULTURAL LABOURERS IN
1902, 1907 AND 1912-13.

Autho- rity	Year	Div. 1	Div. 2	Div. 3	Div. 4	Div. 5	Div. 6	Div. 7	Range
		<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d.</i>	<i>s. d. s. d.</i>
<i>a</i>	1902	20 1	19 1	16 9	16 6	16 2	18 6	15 9	15 9-20 1
<i>b</i>	1907	19 10	19 0	17 3	16 11	16 3	18 3	15 10	15 10-19 10
<i>d</i>	1912-13	21 7	20 5	19 1	17 10	18 4	19 11	18 2	17 10-21 7
<i>e</i>	1912-13	21 11	20 8	18 1	17 7	16 10	18 10	16 4	16 4-20 8

- a.* Wilson Fox, Second Report on Wages, Earnings and Conditions of Labour, Cd. 2376, 1913.
b. Enquiry into Earnings and Hours, 1907.
c. Wages and Conditions in Agriculture, 1919, Cd. 24.
d. Central Land Association Enquiry.
e. Rural League Enquiry.

It is plain from Table X that wages were still rising. If the details given in Wilson Fox's second report be examined, it appears that cash wages in Co. Durham were standing at £1 a week, while in Dorset, at the other end of the scale, the farm worker was getting on an average 11s. 11d. a week. This state of affairs did not change very much during the next few years. Wilson Fox remarks that figures supplied to him for the years

1903 and 1904, too late for inclusion in the Second Report showed that wage-rates were stable.

The Enquiry into Earnings and Hours, of 1907, based its findings on reports concerning 20,000 ordinary farm labourers. It showed unimportant changes since the Wilson Fox Report. The gap between wages in the north and in the south had been lessened somewhat by a loss of a few pence in the north and an increase of a few pence in the rest of the country, except in the eastern counties where there was no change. Taking the two reports together, it is clear that up to 1907 Essex, Norfolk and Suffolk had sunk to the position of the counties of lowest wages, displacing the south-western group, but Dorset, Wilts, Cambridge and Northampton were very little higher.

In 1912-13, two unofficial enquiries into wages and earnings were made, the one by the Central Land Association and the other by the Rural League. For the most part there is a general agreement between the two enquiries, though the figures of the Rural League are much lower for the eastern and south-eastern counties, the difference in Essex, Suffolk and Norfolk being so much as 1s. 10d. a week. It must be remembered that both these enquiries were undertaken with political motives in the background, and the results are probably even less precise than those of the official enquiries. In so far as these two enquiries are conclusive, they show that the tendency in earnings from 1907 to 1913 was still upward. But the period was one of rising costs of living. The index number of retail prices for food in London show a rise of 16 points between 1900 and 1913, and assuming that the rate of increase in food prices was the same throughout the country, it may be said that the increased earnings of the farm worker were set off in large part by the increase in the cost of food. The conclusion reached in the Enquiry into the Cost of Living of Rural Workers¹ was that the cost of the average dietary of the agricultural labourer's family of six persons was 13s. 5½d. in 1902 and 15s. 6d. in 1912-14. The other items of expenditure did not vary in cost, and the total increase in the cost of living during the ten years amounted to 11 per cent. It is doubtful, therefore, whether the rise in wages represented any clear gain to the worker.

Before passing on to consider the abnormal experiences of the war years and after, it might be well to note that all the foregoing calculations of wages are based on the assumption of a full week's work. Before the reform of the Poor Law, earnings were supplemented by parish relief, but then, and probably for long after, wages in all the live-stock districts and to a great extent in the corn-growing districts were weekly wages. They

¹ *Financial Results of the Occupation of Agricultural Land and the Cost of Living of Rural Workers*, 1919, A. W. E., 384, pp. 30 seq.

continue such, perforce, in the live-stock industries up to the present day, but the labour disputes of the early 'seventies, followed by the agricultural depression, did much to break the tradition which imposed an obligation on the master to find work for his man. "You have got a good house and fifteen shillings a week," said one of the writers of this article to a dissatisfied farm worker in 1910. "No, sir, I get half a crown a day, and last week I earned ten shillings," was the reply. It is impossible to measure the effects of such cases in any calculation of wages and earnings, but while it is necessary for the purposes of an historical review to base estimates on the assumption of a full week's work, it must be remembered that this was not always forthcoming, and that by a certain proportion of the agricultural labourers the full weekly wage was not invariably attainable.

(b) 1914-1931.

Information for conditions during this period is available in the report on Wages and Conditions of Employment in Agriculture. The general results have been shown in Table X, and they mark a slow rise soon after the war began. The average weekly cash wage usually given for the whole country in the period before the war is 15s. 8d. By 1917, the average summer rate, according to the investigators in the 1919 enquiry,¹ was 23s. 7d., a rise of 40 per cent. The cost of living, meantime, had increased 76 per cent. In 1918, just before the introduction of the statutory minimum wage, the average weekly rate for the country was 27s. 1d., an increase of 62 per cent., while the cost of living at the end of the first three months of the year had risen 190 per cent. Wages were rising fast, but the cost of living rose faster. Farmers were seeking assistance for arable cultivation; Parliament decided that guaranteed prices must have their corollary in a guaranteed minimum wage. And so was passed the Corn Production Act, 1917, to give assistance both to farmers and farm workers.

The Statute enacted a minimum wage of 25s. weekly for farm labourers, but the Wages Board set up under its provisions, acting on the recommendations of the County Wages Committees which it called into being, quickly raised this wage in all parts of the country in view of rapidly rising prices. By the middle of the year 1918, 30s. was the lowest weekly wage in any part of England for men of 18 years and upwards, and this for a week of 54 hours in the summer and 48 hours in the winter. Overtime rates were ordered for time worked beyond these hours, and higher weekly rates were fixed in most cases for special classes of labour such as cowmen, waggoners, &c.

¹ Quoted, p. 24, A. W. B., 384.

The cost of living continued to rise, and during the next three years the County Committees were kept busy recommending increases in minimum rates, and the Agricultural Wages Board in giving effect to them. The maximum was reached in August, 1920, when wages stood nowhere at less than 42s. a week, and nearly 10s. higher in the northern counties.

The period of high wages lasted just a year. In September, 1921, following the policy of deflation of the Government, the first revision in a downward direction occurred. Cuts of as much as 6s. were made, but before the Agricultural Wages Board was called upon to grapple with the difficult task of progressive wage reduction, it passed out of existence on the repeal of the Corn Production Act.

The Government endeavoured to provide substitutes for the Wages Board by what were known as Conciliation Committees, which were set up in every county in the expectation that they would regulate wages by collective bargaining. It was seen almost at once that they would fail in their purpose, and within a year or so, they had given up all pretence of functioning. Farmers dealt directly with their men, and the labour organisations were not strong enough to be effective. By the end of 1922, the average wage throughout the country was down to about 28s., and so it remained until another Wages Board was set up under a special Act, in 1924.

The effect of the first Wages Board on wages generally had

TABLE XII.

WEEKLY RATES OF CASH WAGES FOR ORDINARY AGRICULTURAL WORKERS, 1918-1931.*

Year	Div. 1		Div. 2		Div. 3		Div. 4		Div. 5		Div. 6		Div. 7	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1918 Sept.	34	4	32	5	31	6	30	5	30	5	32	2	30	8
1919 May	39	6	38	2	37	1	36	5	36	9	38	8	37	2
1920 April	45	3	42	6	42	2	42	0	42	1	43	0	42	2
1920 Aug.	49	3	46	6	46	2	46	0	46	1	47	0	46	2
1921 Sept.	43	5	42	1	42	0	42	0	42	0	42	3	43	4
1924	31	10	27	10	27	9	28	6	26	7	27	3	25	8
1925 Sept.	34	8	33	9	30	8	31	1	30	3	31	5	29	5
1926	34	8	33	7	30	10	31	1	30	5	31	8	30	0
1927	34	5	33	7	30	10	31	1	30	5	31	9	30	0
1928	34	5	33	7	30	10	31	1	30	5	31	9	30	0
1929	34	5	33	7	30	10	31	1	30	5	31	9	30	0
1930	34	7	33	7	30	10	31	3	30	5	31	9	30	0
1931	34	11	32	11	30	6	31	3	30	5	31	9	29	4

* For the years 1918-21, county rates according to the *A.W.B. Gazette* have been taken as basis for an unweighted average. For 1924 onwards, the reports of the proceedings under the *A.W.B. (1924)* have been used.

been to level out to some extent local differences in rates of pay, for although the northern counties emerged with their higher rate still maintained, the proportional difference was much reduced. The return to *laissez-faire* from 1921 to 1924, proved once more that in an uncontrolled labour market the northern farm worker could command a higher wage than the southern. At the end of the Wages Board period, the difference between the highest and lowest counties was no more than 3s. a week; in 1924, wages in the northern counties at 31s. 10d. were more than 6s. higher than the average rate prevailing in Essex, Suffolk and Norfolk.

The procedure controlling the new Agricultural Wages Board differed from that of the first one. Power to fix wages was vested not in the Board but in the County Committees, and although the Board was given powers to refer back for consideration any rate put up to it, the position was, and is to-day, that the Wages Board is merely a registering and publishing body, the work of wage fixing being done in the counties. The effect of statutory wage regulation was, once more, to reduce the differences between the higher and the lower counties, and to restore to the farm worker some of the reduction he had sustained. Wages settled down at about 30s. in the districts more remote from industrialism, and ranged up to 36s. in the highest paid districts. That was in the year 1925, and there was little change from that time onwards right up to the present, when the fall in agricultural prices has led to a demand from the farmers for a reduction in rates, which has, indeed, been effected in two or three counties, whereas in a few others the alternative of a longer working week has been adopted.

It should be noted, in passing, that one of the most important conditions accompanying wage fixing under the statutory Boards has been that the wage is a weekly wage, which must be paid in full to all men regularly employed at that rate who present themselves for work daily throughout the week. The loss of time which could be and not infrequently was experienced by farm workers in the days before control has been mentioned already, and in an employment like farming, subject to seasonal variations in demand and to interruptions from the weather, it might be serious. This grievance, which was often put forward by the farm worker, was now removed.

(c) *The Standard of Living of the Farm Worker since the War.*

The results of this review, so far, of a century of wages and earnings in agriculture have been to show that the halcyon days for the men were those which mark the close of the nineteenth century. Cash wages had reached the highest point then known; the cost of living had dropped. It has been shown, too,

that although the tendency of wages was still upward in the new century, so also was the cost of living, and it is doubtful whether the workers had improved their standard of life by 1914 as a result of their higher wages. It will be of interest and value to consider whether they have been any better off as a result of the greatly enhanced cash wages they have received since that time.

In the first place, it must be noted that under the operations of the Wages Board, all recognised allowances are valued and deducted from the minimum wage. In other words, the cash wage now corresponds to the total earnings. In making comparisons, therefore, it is the total earnings of the pre-war period and not the cash wage which has to be contrasted with the minimum wage of the present day. In the second place, there has been no public investigation of the standard of life of the rural worker and the cost of maintaining that standard since the year 1918.

The rise in the cost of living between 1914 and 1918 is fully discussed in the Report to the Agricultural Wages Board already quoted. The conclusion is that expenditure rose by 85 per cent. during this period for a family of 5½ persons, and if expenditure had risen so much, it is clear that there had been a big jump in family earnings. Moreover, war conditions had modified the

TABLE XIII.

THE DIET OF THE AGRICULTURAL WORKER'S FAMILY IN 1912 AND 1918.*

Article	Diet, 1912	Diet, 1918
	lb.	lb.
Beef and mutton	3.35	3.23
Pork	1.1	—
Bacon	2.08	1.06
Cheese	1.08	0.45
Bread	19.89	23.24
Flour	15.17	12.73
Oatmeal and rice	1.56	2.43
Potatoes	25.75	29.1
Tea	0.51	0.44
Coffee or cocoa	0.15	0.11
Butter	1.04	0.55
Lard, margarine, dripping	1.03	(0.77 Marg. 0.33 Lard)
Sugar	4.57	2.89
Syrup, treacle, jam	1.61	1.39
	Pints	Pints
Milk, new	4½	7.2
„ skimmed	8½	3.9

* A.W.B., 384, pp. 30 and 32.

diet of the worker, in that less meat, bacon and flour were being consumed by him and more bread and potatoes. The differences in the dietary of 1912 and 1918 are set out in Table XIII. Between these years a deterioration in the dietary had taken place, an experience which was shared by all during the war. It is interesting, however, to compare the cost of these two diets since the year 1914, and to compare their cost in each year with the farm labourer's average wage for that year.

The result is set out in Table XIV. In the first two columns are given the average weekly earnings for each year, calculated by different methods. The figures in the first column represent the minimum wage for the standard week as given in the various abstracts of Labour Statistics. The figures in the second column, taken from the N.F.U. Year Book, represent the weekly wage which the labourer would have earned if he were paid at the rates in force in the respective years, but assuming that he were working for the pre-war number of hours. In other words, seeing that the pre-war working week was longer than the week to which the statutory minimum wage-rates applied, the figures in the second column represent a standard week plus normal overtime, and may be taken as an indication of the maximum that a man was likely to earn, while the figures in the first column represent the minimum.

TABLE XIV.

AVERAGE WAGE OF THE AGRICULTURAL WORKER COMPARED WITH THE COST OF CERTAIN ITEMS IN HIS WEEKLY BUDGET.

Year	Minimum Weekly Wage— Labour Statistics	Maximum Weekly Wage— N.F.U. Year Book	Cost of Food, Fuel and Rent on 1912 Diet	Cost of Food, Fuel and Rent on 1918 Diet
	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>	<i>s.</i> <i>d.</i>
1914	18 0	16 9†	19 7	16 11
1918	30 6	34 3	43 0	31 6
1919	37 10½	41 6	39 6	33 6
1920	46 10½	51 4½	47 0	39 6
Dec. 1921	36 10½	42 9	44 0	37 0
1922	27 10	33 0	34 6	29 6
1923	28 0	32 9	32 6	28 0
1924	28 0	32 9	33 0	29 0
1925	31 5	37 0	34 0	29 6
1926	31 8	37 6	33 6	30 0
1927	31 8	37 3	32 0	28 0
1928	31 7½	37 0	31 0	27 0
1929	31 8	37 9	30 0	26 6
1930	31 7½	38 0	28 6	25 0
1931*	31 6	37 9	26 0	23 6

* Figures for this year's wages are the writers' own estimates.

† Does not appear to take allowances into account.

The cost of living in each year, calculated on the dietary available in 1912 and in 1918 respectively, is set out in the next two columns of the Table, the figures being expressed to the nearest sixpence.

The figures cannot be regarded as more than an indication of the expenditure on the three items of food, fuel and rent. Nevertheless, if the changes in the cost of these items on the 1912 standard are compared with the figures for minimum earnings, it is seen that the labourer's wage was always below the cost of food, fuel and rent until the end of the year 1927. Comparing the same budget with the maximum weekly wage, it appears that there remained a margin over expenditure in 1919 and 1920; from 1921 to the end of 1924, the cost of living on the 1912 scale exceeded slightly the earnings, and from 1925 onwards there remained a balance over expenditure.

Considering now the cost of living on the basis of the 1918 dietary, the result is more favourable to the farm worker's economic position. On a basis of minimum earnings there is an adverse balance shown only in a few years; compared with maximum earnings, the balance is always on the right side.

Is there anything to be deduced from these figures? It is clear that without supplementary earnings the labourer could not have provided for clothing, household requisites, insurance, and other items of expenditure. It is impossible to make any accurate estimate of these supplementary earnings by the family; certainly they would not amount to more than 15s. a week while the family was all of school age. Assuming some such figure, there would have been a fair margin for expenditure on these additional items in 1919-21, as it is certain that the dietary must have approximated more to that of 1918 than to that of 1912. From the end of 1921 until 1928, however, it is doubtful whether even the 1918 standard was maintained. Some evidence on the point is forthcoming in Ashby's investigation in 1924.¹ From this it appears that the amount spent on food in 1924 would not have purchased the 1912 dietary and was barely equivalent to that of 1918. He estimates that in families of more than three children the expenditure on food was about 20s. a week, with another 7s. for rent and fuel. The total of 27s. compares with the estimate of 33s. appearing in Table XIV for the 1912 budget, and with 29s. for the 1918 budget. Accepting this evidence, there is reason for saying that from 1921 to 1924 at least, the worker's standard of life was no better and perhaps rather worse than in 1912. On the other hand, during the time of the first Agricultural Wages Board, and particularly from 1919 to the end of 1921, the farm worker seems to have had a fair margin for the provision

¹ A. W. Ashby, "Farm Workers' Budgets," *Journal of the Ministry of Agriculture*, 1924.

of comforts, though, as with other classes of the community, this was achieved at the expense of necessities unobtainable during the war and during the immediate post-war shortage of food.

From 1925 to 1928, with the continued high price of clothing and fuel, the standard of life does not seem to have been higher than in 1912, but since 1928 the fall in retail prices has been a considerable help to the worker, for the wage-level has remained almost constant. In fact, in 1931, he appears for the first time to have been better off than he has been since 1912.

These deductions probably need qualification for certain areas, and they apply only where the family income supplements the earnings of the farm worker himself by 15s. weekly. On the other hand, they take no account of the profits of a large garden or an allotment, nor of the receipt of extra payments by way of pensions.

Finally, it would be of interest to relate the course of wages to that of prices for some years back. To do this on the scale properly demanded would be unwieldy, but the following table indicates, in some measure, the increasing burden of wages upon the farmer since the 'seventies.

TABLE XV.
THE PURCHASING POWER OF WAGES IN TERMS OF WHEAT
AND BEEF.

Year	Weekly Wage	Gazette Price of Wheat in Shillings per Quarter	Purchasing Power of Weekly Wage in Quantities of Wheat.	Prime English Beef in Pence per 8 lb.	Purchasing Power of Weekly Wage in Pounds of Beef.
	s. d.	s. d.	Qrs.	d.	Lb.
1867-71 . . .	12 5	56 0	0.22	55	20.8
1879-81 . . .	13 9	44 6	0.31	56.3	23.2
1892	13 4	30 3	0.44	38	33.6
1898	14 5	34 0	0.42	36	38.4
1902	14 8	28 1	0.52	47	29.6
1907	14 11	30 7	0.49	42	34.4
1914	16 9	34 11	0.48	52.5	30.4
1918	30 6	72 9	0.42	103	28.8
1919	37 10½	72 10	0.52	108	33.6
1920	46 10½	80 7	0.58	125	36.0
1921	36 10½	72 9	0.51	115	30.4
1922	27 10	47 10	0.58	88.5	30.4
1923	28 0	42 2	0.66	79.5	33.6
1924	28 0	49 3	0.55	82	32.8
1925	31 5	52 2	0.60	80	37.6
1926	31 8	53 3	0.59	74	41.6
1927	31 8	49 3	0.64	70	43.2
1928	31 7½	45 0	0.70	74	40.8
1929	31 8	44 3	0.72	71	43.2
1930	31 7½	36 0	0.88	73	41.6

As it stands, this table takes no account of increased efficiency or of economy of labour, nor of those changes of organisation and cropping made by farmers to cut down their costs. Moreover, it has already been suggested that the official average wages given in post-war years are comparable rather with average earnings for pre-war years. This has the effect somewhat of raising the purchasing power of wages for the years 1867 to 1914.

But after these allowances have been made, the table remains suggestive in one or two respects. First it is quite clear that the burden of labour cost, that is the amount of labour required to produce a quarter of wheat or a stone of beef, has been steadily increasing for the last sixty years, and especially large jumps are recorded for the years 1867 to 1892, and 1927 to 1930. On the other hand, the incidence of this increasing cost has not been equally distributed between corn production and beef. Over this period graziers and meat producers, by reason of a higher stability and level of prices, have been affected to a considerably less degree than have cereal farmers, from the rising wages of the agricultural labourer.

CONCLUSION.

As with all studies based on the use of averages made up from unweighted and sometimes doubtful data, such as some of the figures used in this review admittedly are, the description of events and the statements of wages and earnings need qualification and searching criticism at every stage. This granted, however, it should still be possible to draw certain general conclusions from the facts and figures.

Since 1824 the movement of wages has always been upward, though the increase has not always represented a rise in the standard of living. The total advance up to the end of last century expressed as an average throughout the country, was 5s. a week. During the first fourteen years of the present century, a further gain of 3s. weekly is recorded. From 1914 to the beginning of 1918, the wage advanced by 10s., and for the next three years, through the medium of wage regulation under the first Agricultural Wages Board, further gains, amounting ultimately to £1 a week, were secured. Following the repeal of the Corn Production Act and until 1924, wages slipped back, leaving the worker worse off in that year by nearly 20s. than he was during the greater part of 1921. Since 1924, an average increase over the country of 3s. weekly has been made.

Turning now to consider the standard of living as distinct from earnings, it may be said that the standard rose, though very slowly, from 1824 until the 'sixties. The fall in prices from 1874 up to the end of the century marked a material advance

in the worker's real position, which improved, during that time, from 30 per cent. to 40 per cent. above his standard in the 'sixties. It is possible, however, that this estimate should be discounted a little when it is remembered that restrictions imposed in the 'seventies on the employment of women and children may have affected the family income. Between 1900 and 1914 the standard did not decline and may even have risen slightly, but during the first three years of the war, prices rapidly outstripped wages. During this time, however, the labour of women and children became once more important, and it is probable that with their extra earnings the family standard of living fell only slightly, particularly when the difficulty of obtaining supplies is remembered.

The peak point in the farm worker's fortunes is marked by the years 1918-21 when the standard of life was higher than it ever had been save in respect of food. The interregnum between the two Wages Boards saw the collapse of this standard, and a return to conditions certainly no better and probably worse for a time than those of 1912. With the advent of the second Wages Board, wages were stabilised once more, so that when prices of commodities began to fall after 1924, very slowly at first, but later with a rush, the labourer's position became progressively better. By 1928-29 he had returned to his pre-war standard, and since that time the further fall in retail prices has raised him above it.

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REPORT OF THE RESEARCH COMMITTEE.

THE Society, through its Research Committee, has continued during the past year to assist agricultural research by means of financial grants to a considerable number of schemes. Although no individual project has been brought to a conclusion during the past year, satisfactory progress has to be reported, and the Research Committee believe that the expenditure which has been incurred will ultimately be productive of valuable results. In the following report they have summarised the more important features of the past year's work.

I.—WORK IN PROGRESS.

ROTHAMSTED EXPERIMENTAL STATION.

WORK ON THE INOCULATION OF LEGUMES, 1931.

During this year the following lines of research, which arose from our earlier inoculation work, were followed.

A. The Influence of Nitrogen Manuring on the Growth and Nodule Development of Lucerne growing with Grass.

It has been shown that lucerne may benefit from small applications of nitrate, when it is sown on bare ground but, as the crop is sometimes grown in a cover crop or grass mixture, information was needed as to the influence of nitrogen manuring on such a mixture. In a pot experiment nitrate applied to a lucerne and grass mixture depressed both the yield and nitrogen fixation of the lucerne and also reduced the number of nodules formed.

B. The Testing of New Strains of Lucerne and Lucerne Bacteria.

Several new strains of bacteria from lucerne nodules have been isolated and compared with the strain now issued to farmers. The strain at present issued was found to be far more efficient than the new isolations, and in the past it has also been found to be superior to cultures obtained from America. Several strains of clover bacteria have also been tested with the object of improving clover by inoculation. So far, however, the clover bacteria already present in our soils have proved to be as effective as any that have been added.

C. The Progress of Lucerne Inoculation.

About 9,500 cultures have been issued by Messrs. Allen & Hanbury's this season, as compared with some 7,000 in 1930. During the past four years, during which issue of cultures has taken place, the acreage under lucerne in England and Wales has increased by 24.3 per cent. The area under lucerne in the Midlands and southern counties has increased by 57.9 per cent., and that in the south-western counties by 40 per cent. In these two areas lucerne is benefited by inoculation. Samples of the cultures as issued have been tested at Rothamsted and have been found to be pure and to have maintained their efficiency for nitrogen fixation.

REPORT ON THE EXAMINATION OF THE WOBURN DATA CARRIED
OUT BY THE ROTHAMSTED STAFF.

Green Manuring.

As a development of the examination of the data provided for by the Society's grant, the Chemical Department has been able to take up seriously the question of green manuring. An explanation has been found of the curious results at Woburn, and it is shown that green manuring is much less certain in its effects than most farmers suppose. There are, of course, many farms on which it undoubtedly answers well, but the failure at Woburn is not so unusual as was at first supposed. The rather

special conditions necessary for the success of green manuring are now being worked out at Rothamsted.

How long does Lime last in the Soil?

The Woburn results are now giving a good deal of information on this important question. It is shown that a given quantity applied in frequent small dressings lasts longer than the same quantity in large dressings given at intervals of several years, and that better compensation should therefore be awarded. Of a one-ton dressing of lime 26 per cent. was lost, but when a second ton was added 50 per cent. of this extra lime was lost. Whilst it will perhaps be difficult it should not be impossible to work out a better basis for valuation of unexhausted lime than we have at present.

Nitrogen Content of Barley Grain.

Some very interesting results were obtained for the nitrogen content of barley grain, which was found to be closely connected with the variation in rainfall throughout the growing-season. It has been demonstrated beyond doubt that additional rainfall in May, June and the first half of July has the effect of lowering the nitrogen content, while additional rainfall in March (and perhaps August) probably increases the content, though this effect is not so marked. Knowing the rainfall, it has been found possible to predict with considerable accuracy the nitrogen content of the grain.

This result is important because the malting value of barley lies chiefly in its nitrogen content. Good malting samples may have nitrogen contents from about 1.2 to 1.6 per cent.; samples above 1.8 per cent. generally serve only for grinding.

The Woburn data show what are the factors that determine the nitrogen content and therefore the malting value, and they show how a buyer could form a useful judgment at the end of June of the regions where he is likely to get good samples, and also how a farmer could judge whether his barley is likely to be good or not. Experiments made under the Institute of Brewing Research Scheme show how far the farmer can actually control the nitrogen percentage of the grain.

Yield of Wheat.

An analysis of the 30 annual yields from 1877 to 1906¹ was made with a view to discovering the effect of weather on the variation of the crop. This analysis was undertaken on the same lines as the very successful analysis of wheat on Broadbalk field at Rothamsted. Although the results for Woburn are not so satisfactory, some interesting results were obtained for the plots

¹ The manurial dressings were reduced after 1906.

without nitrogen. These are, broadly, that additional rainfall does little damage, or is perhaps actually beneficial, during the period from November to February, and is harmful from March onwards, the period of maximum damage occurring in April, May and June. At Rothamsted, on the other hand, winter rainfall was found to be harmful.

MASTITIS IN COWS.

The research work on this disease at the Institute of Animal Pathology, Royal Veterinary College, London, has been continued during the year.

1. *Bacteriology of Mastitis.*

(a) The streptococcus most commonly associated with mastitis in cows has tolerably well-defined characters. Although this organism produces disease in the cow's udder, there is fortunately no reason to believe that it is capable of causing disease in human beings.

During the past year a more intensive study of mastitis streptococci has been pursued, and as a result it has been found that a number of the strains examined possessed characters which were strikingly different from those of the streptococci ordinarily present. The real importance of this observation, however, lies in the discovery that the strains in question were quite indistinguishable from certain streptococcus strains of human origin, a large series of which were examined for comparison. It should be stated that most of these strains from man had been isolated from the throat, and that some of them were from actual cases of disease in human beings. There are therefore strong grounds for surmising that the mastitis streptococci in question were of human origin, and that they had been implanted in the udder during the course of milking. Out of 82 cases of clinically obvious streptococcus mastitis taken at random, bacteria of this nature were encountered in 13 cases, suggesting that infection of the udder with streptococci from man is more frequent than has been hitherto supposed. These 13 cases occurred in widely separated parts of the country, and in cows which had been hand-milked. It is to be noted, however, that in none of these instances could any history be elicited of coincident disease in persons in contact. These findings are of importance not only to the public health officer, but also from the standpoint of the dairy farmer, because they emphasise the necessity of cleanliness in milking and of attention to the health of the milking personnel. An article giving details of these observations was published in the *Journal of Comparative Pathology* during 1931.

(b) As pointed out in last year's report to the Research Com-

mittee of the Society, a number of different kinds of streptococci can be isolated from udder milk, and for more than one reason it is essential to know whether given strains are to be regarded as potential incitants of disease or as harmless inhabitants of the udder. Information on this subject is now being systematically acquired by examining at intervals milk samples from a number of individual cows and making a record of the varieties of streptococci present, any abnormalities in the milk, and the history of the animals.

2. *Different Forms of Streptococcus Mastitis.*

By far the most prevalent form of streptococcus mastitis is that in which the course of the disease is essentially chronic and insidious. In this form obvious changes in the gland are sometimes in abeyance for long periods, though from time to time acute or subacute changes may be expected to appear, especially at the beginning or end of lactation, or when the udder is "overstocked." The disease, however, is usually progressive and leads to "lightness" or total loss of the affected quarter. On the other hand, clinicians have recognised a form which runs an acute course and which in the more severe cases may be followed by rapid destruction of the quarter. There is little evidence from the literature on the subject that the real significance of these clinical differences have been appreciated in the past. From the bacteriological work carried out at this Institute, to which reference has been made in the first section (1b) of this report, it has become evident that the clinical differences between the acute and chronic forms, as just defined, are dependent upon the presence of distinct varieties of streptococci. Such distinctions are clearly of the greatest importance when problems, such as the method of spread of infection in a herd or control of the disease by any system of vaccination, come up for consideration.

3. *Diagnosis.*

In the last Report to the Research Committee, attention was called to the fact that in attempting to diagnose those cases of mastitis, which are not readily detectable by clinical means, methods involving cultivation of the causal organism hold first place. Such methods, however, may be rather cumbersome when they are used on a large scale. In consequence, efforts towards simplifying the technique have been continued during the past year. For this purpose a new culture medium has been developed and this is now being put to practical test with a considerable measure of success.

4. *Prevalence and Economic Importance of Mastitis.*

Further experience has emphasised the wide prevalence and

high incidence of streptococcus mastitis. Milk samples from some 1,285 cows belonging to 23 herds have now been examined, and 503 cows (39.1 per cent.) have been found to be definitely infected in at least one quarter of the udder. Unfortunately, as pointed out in last year's report, the disease is by no means confined to herds in which the general standard of cleanliness is low.

In one well-managed herd of 38 cows, in which for a number of years great pains have been taken to control the spread of udder diseases, a bacteriological examination of milk samples showed that 6 cows (15.7 per cent.) were definitely infected. This instance appears to show, as might be anticipated, that methods which do not suffice to detect cows with latent infection, cannot be expected to bring about the complete elimination of chronic streptococcus mastitis.

Mastitis undoubtedly causes enormous economic loss to the dairying industry. Apart from such effects as the diminished market value of the infected animal, the disease leads to a reduction in the yield and a depreciation in the quality of the milk secreted. At present, there is no clear conception as to the loss of milk caused in the aggregate by mastitis, but it is hoped that it may be possible to procure data on this point in the future.

5. Control of Mastitis.

The control measures relating to chronic streptococcus mastitis have been continued in accordance with the scheme outlined in last year's report. Some 400 cows belonging to 6 herds are now under observation, and it may again be said that the results are encouraging. In one herd originally numbering about 70 milch cows, and from which 8 found to be infected at the first tests were promptly eliminated, the chronic form of streptococcus mastitis has not been observed for the past 18 months. This herd, which has been recruited with home-bred or purchased first-calving heifers, now numbers about 80 milch cows.

In three other herds, which are under control and in which a number of the originally infected cows still remain, only a small minority of previously healthy cows have had to be transferred to the infected group. Time alone can show to what extent eradication measures on these lines will be successful.

THE ECONOMIC USE OF SUGAR-BEET TOPS.

The investigation undertaken at the Norfolk Agricultural Station, and outlined in the Research Committee's report last year, has been continued. The experiments have been designed to determine the comparative feeding values of sugar-beet tops

and roots when fed to bullocks and when fed to sheep, and the manurial value of the tops when fed to sheep and when ploughed in. The financial return obtained under each method of disposal is also being investigated.

It is realised that, in addition to the above, there are other problems, in connection with the disposal of sugar-beet tops, which require investigation. It was felt, however, that it would be better in the first place to deal with a few problems thoroughly rather than to attempt, in one series of trials, to elucidate all.

The feeding value of the tops for fattening bullocks in yards was investigated by recording the live-weight increases of 10 bullocks fed on a ration of tops, hay, and concentrates. A comparison with roots and with dried beet pulp was obtained by feeding similar groups, of 10 bullocks each, on these materials. For each of the three yards the basal ration of hay and concentrates was the same, while the respective weights of tops, of roots and of pulp were such as to give the same calculated feeding value in each case. The individual bullocks in each yard were weighed at monthly intervals. The trial with tops ended in January, 1931 (when the supply of tops gave out), but the other two yards were continued until March, when the bullocks were sold fat. A detailed report will be published later, but meanwhile the following figures of average live-weight increase (in lb. per head per day) during three successive seasons may be of interest.

	1928-9.	1929-30.	1930-31.
Beet Pulp	2.0	2.0	2.0
Roots	2.5	1.6	2.0
Beet Tops	1.9	1.6	1.7
Number of Bullocks in Trials	30	29	30

A similar trial was carried out with sheep, one pen of 24 hoggets being fed on tops and another on roots, with a common basal ration of hay and concentrates. The quantities of tops and of roots were adjusted so as to give identical calculated food values. As was expected, the tops deteriorated in condition during the last month of the trial (January), and the pen consuming the tops made a correspondingly poor performance. At least one further season must elapse before any useful conclusions can be drawn, and therefore publication of the figures is deferred.

In addition to this sheep-feeding trial a further experiment was carried out to determine the relative manurial values of beet tops and of roots when sheep-folded. This was done by determining the yield of the succeeding barley crop. For purposes of comparison, further plots were included where the beet tops were ploughed in and carted off respectively. In this trial the sheep received no concentrates but only hay in addition to the beet tops or swedes, and no artificial manures were applied.

Thus the barley crop gave a direct measure of the respective values, in the first year, of the manurial residues. As the manurial values may conceivably vary according to the time of sheepling, two experiments were carried out. In one the folding and ploughing down of the tops was done in December, and in the other the folding and ploughing down was done in January. In each case the experiment was laid down on Dr. Fisher's randomised block method. It is proposed to record the yields of successive crops upon these plots throughout a rotation, in order to secure complete evidence of the residual manurial values. Obviously the figures for one year cannot be usefully discussed.

In the experiment last described no artificials were applied. A separate trial was, however, carried out in 1931, in which a complete dressing of artificials was used both where the beet tops were ploughed down and where they were carted off. The results were as follows:—

					Bushels.
Tops ploughed in (mean of 10 plots)	.	.	.	.	53.6
Tops carted off (" " ")	:	:	:	:	46.7
Difference	.	.	.	.	6.9

In 1929 the increase obtained from ploughing in the beet tops was 8 bushels per acre, and in 1930 it was 4 bushels. It is evident that the effect of season determines to some extent the returns obtained from the ploughing in of the tops, but that, on the average, their manurial value would appear to be considerable.

EXPERIMENTS IN HAMPSHIRE.

In view of the Society's summer meeting at Southampton this year the Committee have, in consultation with the Earl of Radnor, Sir John Russell and Mr. Troup (Agricultural Organiser for Hampshire), arranged the following programme of experiments.

- I. *Two experiments to investigate the effect of Sheep Folding and other methods of maintaining fertility on light land, with particular reference to a corn-growing system.*

The opinions of experienced farmers on the large chalk area of the south of England, though chiefly in favour of arable sheep as an integral part of the farming system, vary from this to the opposite view that arable land may be kept in fertile condition by the use of artificial manures alone. There is no real experimental evidence available, but it is interesting to note that information will be forthcoming from the Norfolk Agricultural Station on the parallel problem of the effect of sheep in conjunction with the sugar-beet crop—an experiment which is already being carried out in conjunction with the Royal Agricultural Society.

In view of the diversity of opinion both of practical and scientific men, and the publicity given to the view that corn-growing on mechanised lines is a practical solution of the problem of arable farming in this area, it would seem to be important to obtain basic and reliable information on the question, and also information on the effect of ploughing in green crops or straw as a substitute for sheep-folding.

The experiments have been discussed and the technique agreed upon by members of the staff of the Rothamsted Experimental Station.

The diverse views result partly from the extreme variation of land overlying the chalk and for this reason the experiments are being repeated at various centres. In both experiments the effect of the different treatments will be measured on at least the two succeeding crops—the first of which will in every case be a cereal.

First Experiment.—In a root crop of swedes, kale, or swedes and kale, to be followed, if possible, by two corn crops—

Plot 1. Folded by sheep fed with concentrates.

Plot 2. Folded by sheep fed with concentrates and straw added.

Plot 3. Roots carted off and no manure applied for succeeding crops.

Plot 4. Roots carted off and nitrogen, phosphates and potash applied in the following spring.

Plot 5. Roots carted off and nitrogen, phosphates and potash plus straw applied in the following spring.

Plot 3 is the control, and Plots 1, 4, and 5 contrast the effects of sheep-folding, of a complete dressing of artificials, and of the same artificial dressing plus an equivalent amount of organic matter in the form of straw. Straw is chosen as a convenient form of organic matter, but also because it is likely to be the most economic to use under conditions of increased cereal production, particularly when its market value is depressed after harvesting with a combine harvester. Plot 2 is included because there is evidence (which requires confirmation) that after sheep-folding nitrogen is washed out of the soil before it can be used by the corn crop, and that this loss may be reduced by the addition of straw.

Another plot has been added in which the crop has been carted off, and the same dressing of straw as in Plot 5 added and ploughed in, but no artificial dressing given. By this addition some measure of the effect of the addition of organic matter alone will be possible, as compared with a complete artificial dressing (Plot 4), and of the combined effect of the two (Plot 5). It is not proposed to use a dressing of artificials

equivalent to the amounts of nitrogen, phosphate and potash returned to the land in Plot 1, in the case of Plots 4 and 5, but a straightforward mixture which would be recommended in normal farming practice.

A crop has been used for the experiment which could be folded before Christmas.

This experiment is being carried out very accurately with small plots at the Farm Institute, Sparsholt, in a "Latin Square" (each plot repeated five times), and on larger plots of a quarter or half an acre each in two "randomised blocks" at four other centres, Horndean, Andover, East Tytherley and Odiham.

Second Experiment.—On land in corn to be followed by a second corn crop, trefoil seed being sown in the spring, and the yield of the second corn crop being measured :—

- Plot 1. Trefoil sown and ploughed in, in autumn, complete dressing of artificials before succeeding crop.
- Plot 2. Trefoil sown and ploughed in, in autumn, no artificials.
- Plot 3. Trefoil sown as in Plots 1 and 2 and folded by sheep—complete dressing of artificials before succeeding crop.
- Plot 4. As Plot 3, but no artificials.
- Plot 5. No seeds sown, no artificials.
- Plot 6. No seeds sown, complete dressing of artificials before succeeding crop.

Plot 5 is the control, and the residual effect of artificials alone or in addition to the green crop either ploughed in or folded off, and of these last treatments without artificials are contrasted.

The plots have been uniformly treated for the succeeding crop, which will also be weighed.

Trefoil is chosen as a green crop because of its cheapness—the seed is inexpensive and no extra cultivations are required. The experiment was started in the past spring, and the first results should be available in the 1932 corn crop.

The same technique in regard to plots and centres is being carried out as in the first experiment.

This experiment is being repeated at eight centres, a mixture of trefoil and Italian ryegrass being substituted at some for pure trefoil.

II. *Experiments on Lucerne.*

A crop such as lucerne is needed in the area, both as a source of hay and of greenstuff during the early summer droughts which often occur. It is not widely sown because of the uncertainty of obtaining a "stand," and while there has been a good deal of investigation on such points as inoculation of seed, variety of seed, addition of lime, and method of sowing, it is clear that

further points of treatment and management require investigation. There are indications that some of the most important are those set out below, on which it is sought to get evidence which is at present not available.

On all plots any lime deficiency in the soil has been made good. A Hungarian strain of seed called "Bekesisaba" (recommended by the Director of the National Institute of Agricultural Botany) has been used in preference to "Provence"; seed was inoculated and broadcast under a cover crop in April.

First Series.—25 lb. of lucerne and $1\frac{1}{2}$ bushels spring oats sown per acre.

The plots manured as follows:—

Plot 1. Potash only.

Plot 2. Phosphate only.

Plot 3. Potash and Phosphate.

Plot 4. Potash + Phosphate + Nitrogen.

For observation purposes, half of each of the plots will be cut for hay in July and the other half cut when the oats are ready for harvest.

Second Series.— $1\frac{1}{2}$ bushels spring oats drilled as cover crop.

Plot 1. 25 lb. lucerne seed broadcast per acre.

Plot 2. 25 lb. lucerne plus 4 lb. cocksfoot broadcast per acre.

Plot 3. 25 lb. lucerne plus 4 lb. Italian ryegrass broadcast per acre.

All plots received a "complete" dressing of artificials, and will be cut in July.

Third Series.

Plot 1. 25 lb. lucerne seed broadcast in spring oats and cut in July.

Plot 2. 25 lb. lucerne seed and 2 lb. rape broadcast and run over by sheep when rape is ready.

Both plots received a "complete" dressing of artificials.

Plots are of $\frac{1}{4}$ acre each, and in duplicate.

This experiment was put down at four centres in 1931, viz., Wickham, Hatchwarren, Andover and Ashley (Series 1 and 2 only). Results should be available in 1932. Four new centres will be established in 1932, using Provence lucerne and including, in the First Series, plots with farmyard manure.

GRASS LAND EXPERIMENTS.

Owing to the curtailment of their grant for the current year the Committee have had to defer for the present the further Grassland Experiments which it was proposed to conduct in Leicestershire.

II.—AGRICULTURAL RESEARCH IN 1930.

The annual review of the research work of the year in the principal branches of agricultural science and economics, prepared under the direction of the Committee, was issued in December. The distribution to members making application and by sales to the public amounted to upwards of 4,000 copies.

Professor R. G. Stapledon replaced Professor Engledow as the contributor on Crops and Plant Breeding. Otherwise the panel of contributors was the same as for the previous year.

III.—MEDAL AND PRIZE FOR ORIGINAL RESEARCH.

Two essays were submitted for the Medal and Prize offered annually by the Society for original research. Sir John Russell and Mr. W. Burkitt, who kindly acted as adjudicators, reported favourably on that submitted by Mr. E. Lorrain Smith, M.A., and entitled "The Migration of Farmers in relation to the Economic Development of Great Britain since 1830." The Committee recommended that the Council should award the Silver Medal and Prize to Mr. Lorrain Smith.

It has been decided to repeat the offer of the Medal and Prize for Competition in 1932 under the same conditions.

CONTEMPORARY AGRICULTURAL LAW.

I.—LEGISLATION.

AGRICULTURAL interests are considerably affected by Acts of Parliament passed in 1931.

The Ancient Monuments Act, 1931 (21 & 22 Geo. 5, c. 16), only requires a short notice. It provides for the preparation and confirmation by the Commissioners of Works of schemes for the purpose of preserving the amenities of any ancient monument. Every preservation scheme must under Section 1 define, by reference to a map annexed, the area to which the scheme is applicable (called "the controlled area"), and may provide for the prohibition or restriction of the erection of buildings, structures and other works above ground within the controlled area, for the prohibition or restriction of the felling of trees, quarrying and excavations within the controlled area and for otherwise restricting the use of land within the controlled area, to such extent as may appear to the Commissioners to be expedient for the purpose of preserving the amenities of the monument. Any person whose property is injuriously affected by a preservation scheme is entitled to obtain compensation in respect thereof from the Commissioners, subject to the provisions of the Second

Schedule to the Act which require notice of a claim for compensation to be made within three months from the date on which the scheme comes into force and refer any disputes as to the compensation to arbitration under the Acquisition of Land (Assessment of Compensation) Act, 1919. The First Schedule to the Act contains provisions as to confirmation, variation and revocation of Preservation Schemes which amongst other things provide that before confirmation by the Commissioners any scheme shall be advertised and opportunity given to persons affected to state objections and modifications required, which must be considered by the Commissioners before they confirm the scheme.

The Housing (Rural Workers) Amendment Act, 1931 (21 & 22 Geo. 5, c. 22), extends the time for applying for assistance to local authorities for grants or loans under the Housing (Rural Workers) Act, 1926, to October 1, 1936, in lieu of October 1, 1931.

The Finance Act, 1931 (21 & 22 Geo. 5, c. 28), contains provisions for the imposition of a land tax which are many and complicated but which need only be dealt with in this article so far as they may affect agricultural land. Part III of the Act imposes for the financial year ending March 31, 1934, and each subsequent financial year a tax, to be called "land value tax," at the rate of one penny for each pound of the land value of every land unit. By Section 11, Subsection 1, the Commissioners of Inland Revenue are to cause to be ascertained the land value of every "land unit" (which means generally every piece of land in separate occupation), that is to say, the amount which the fee simple thereof with vacant possession might have been expected to realise upon a sale in the open market upon the valuation date, upon the assumption that (a) there were not upon or in the unit (i) any buildings, erections, or works except roads, and except works executed for agricultural purposes, and except any buildings, erections, and works in so far as they are necessary for the reclamation of land or the protection thereof from flooding or for maintaining the stability of the unit; (ii) anything growing on the unit except grass and except any heather, gorse, sedge or other natural growth, and in the case of agricultural land, except also hedges and trees; (b) the sale price had been computed without taking into account (i) the value of any minerals as such, or the value of any mineral way-leaves; (ii) the felling value of any trees; (iii) the value of any shooting or fishing rights; (iv) the value of any tillages or manure, or of any improvements specified in paragraphs (20) to (27) of the First Schedule to the Agricultural Holdings Act, 1923, being tillages, manure or improvements for which any sum would by law or custom be payable to an outgoing tenant; (c) the sale, save as hereinbefore stated, included all property and rights

which, if the unit had been conveyed at the valuation date, would, by virtue of Subsection 1 of Section 62 of the Law of Property Act, 1925, have been deemed to be included in the conveyance; (d) that the unit was free from any incumbrance (not including tithe or tithe rent-charge) except certain incumbrances mentioned in the First Schedule to the Act, which include easements, rights of common, customary rights, liability for repair or maintenance of embankments or sea walls, &c. By Subsection 2 of Section 11 where at any valuation date any land comprises agricultural land the Commissioners, in addition to ascertaining the land value of the unit, are to cause to be ascertained the cultivation value of the agricultural land comprised therein, that is to say the land value (a) if there had been a restriction imposed by law on the user of the agricultural land permanently prohibiting its use for any other than agricultural purposes of the class for which it was actually used at the valuation date, and (b) it had not been assumed that there were not upon or in the unit any agricultural cottages or agricultural buildings used solely in connection with these agricultural purposes. By Section 12 the Commissioners are to keep records of (a) the description of the unit, (b) the amount of the land value thereof, and (c) the amount of the cultivation value of any agricultural land comprised therein. Section 14 provides for objections to and appeals from valuations by the owner of any land unit, the latter being to one of the panel of referees appointed under Act I of the Finance (1909-10) Act, 1910, whose decision will be final subject to an appeal on a point of law by special case to the High Court. By Section 18, Subsection 1, for the purposes of the charge of the tax the land value of every land unit not being a unit in respect of which a cultivation value is shown will be reduced either (a) by an amount equal to four times the land value of the unit for income tax purposes (i.e., for income tax under Schedule A of the Income Tax Act, 1918), or (b) by an amount equal to seven-eighths of the land value of the unit whichever is the less, and by Subsection 2 for the purposes of the charge of the tax the land value of every land unit in respect of which a cultivation value is shown will be reduced either (a) by the amount of the cultivation value, or (b) by the amount by which the land value would have been reduced under the last foregoing subsection if no cultivation value had been shown by the entries relating to the unit, whichever is the greater. The result of these provisions appears to be that land with a cultivation value exceeding its value for other purposes will be relieved from the land tax altogether, or in cases where such value for other purposes exceeds the cultivation value will only be liable to the extent of its value above the cultivation value. In this part of the Act the expression

"Agricultural land" means land and buildings with respect to which, by reason of Subsection 2 of Section 67 of the Local Government Act, 1929, no particulars are included in any valuation list, or which are deemed under that subsection to have no rateable value for the purposes of the list, but also includes any farmhouse occupied in connection with such land as aforesaid and any agricultural cottage so occupied which is on or contiguous to that land; and "agricultural purposes" means (a) the use of land as arable, meadow or pasture ground, or for a plantation or a wood or for the growth of saleable underwood, or in relation to land exceeding one quarter of an acre, for poultry farming, (b) the use of land as market gardens, nursery ground, or orchards, (c) the use of land as cottage gardens exceeding one quarter of an acre, or as allotments, including allotment gardens within the meaning of the Allotments Act, 1922. By Section 28 on the occasion of (a) any transfer or sale of the fee simple of land, (b) the grant of any lease of land for a term of seven or more years, (c) any transfer or sale of any such lease it is the duty of the transferee, lessee, or proposed lessee to produce to the Commissioners the instrument of which the transfer is effected, or the lease, granted or agreed to be granted as the case may be. Failure to do so will render him liable to a penalty. The Commissioners will affix the denoting stamp upon due production of an instrument. It has been announced that the valuation of land for the purposes of this Act is not to be proceeded with, having regard to the present financial position of the country, but this Act remains on the Statute book and may be made use of when circumstances have altered.

The Beet Sugar Industry (Assistance) Act, 1931 (21 & 22 Geo. 5, c. 35), by Section 1 provides for the making of advances to certain manufacturers of British beet sugar in respect of sugar manufactured by them from home-grown beet during the period of one year commencing on October 1, 1931. The maximum quantity of sugar in respect of which advances may be made in respect of each scheduled factory is 300,000 cwt., and it is provided that an advance will not be made under this section unless the Minister of Agriculture and Fisheries is satisfied that the price paid or agreed to be paid to the grower of the beet represents a rate not less than the price per ton specified in the Second Schedule to the Act which fixes the minimum price at 38s. per ton calculated according to the rules therein laid down.

The Housing (Rural Authorities) Act, 1931 (21 & 22 Geo. 5, c. 39), by Section 1 empowers the Minister of Health, on the recommendations of a committee appointed by him for the purposes of the Act, to undertake to make special contributions towards the expenses to be incurred by certain Rural District Councils in providing houses in the agricultural parishes of their

districts for agricultural workers and persons of substantially the same economic condition. Contributions are only to be made to Rural Councils who have, before November 30, 1931, made application to the Committee for the purpose and satisfied the Committee that their financial resources are insufficient to enable them, without assistance, to make adequate provision in the agricultural parishes of their districts for meeting the need for houses of such agricultural workers and other persons. A contribution under this section will be such sum payable annually for a period of 40 years in respect of each house as the Minister on the recommendation of the Committee may determine to be appropriate to the circumstances and will be in addition to contributions payable under the Housing (Financial Provisions) Act, 1924, or under Section 34 of the Housing Act, 1930. The rents to be charged by a council for the houses in respect of which contributions are made are not to exceed such sums as may be determined by the Minister in accordance with recommendations of the Committee.

The Agricultural Produce (Grading and Marking) Amendment Act, 1931 (21 & 22 Geo. 5, c. 40), by Section 4 provides penalties of imprisonment or fine to be imposed on any person who uses in connection with any article any mark or description of such a character or in such manner as to be calculated by reason of the resemblance of that mark or description to a grade designation mark or to any prescribed part of a grade designation mark or by reason of that mark or description being or incorporating the words "national mark" or otherwise to lead to a false belief that the article is an article of a class to which designations indicating quality have been prescribed by regulations made under statutory powers.

The Agricultural Land (Utilisation) Act, 1931 (21 & 22 Geo. 5, c. 41), by Part I empowers the Minister of Agriculture and Fisheries to acquire and hold land for use as demonstration farms and also to acquire land for purposes of reconditioning by reclamations, drainage or other work necessary to enable it to be satisfactorily and economically used for agricultural purposes. Part II empowers the Minister to provide small holdings with financial assistance for unemployed persons and for agricultural workers applying, being or having been members of His Majesty's Forces; also to provide allotments not exceeding one acre for unemployed persons and to defray losses incurred by local authorities in providing allotment gardens for unemployed persons and to make grants for assisting in the provision of seeds, fertilisers and equipment for unemployed persons. As it has been announced that this Act is not to be brought into operation at present it has been thought unnecessary to state its provisions more in detail.

The Agricultural Marketing Act, 1931 (21 & 22 Geo. 5, c. 42), was passed to enable schemes to be made for regulating the marketing of agricultural products, to confer powers upon boards and other bodies in connection with or acting for purposes connected with such schemes, to establish agricultural marketing funds for the purpose of making loans thereout to the boards aforesaid, to encourage agricultural co-operation, research and education, and to provide for purposes connected with the matters aforesaid. By Section 1, a scheme regulating the marketing of an agricultural product by the producers thereof may be submitted to the Minister of Agriculture and Fisheries, who may approve the scheme after considering objections and representations duly made in respect thereto and after holding such inquiries (if any) as he thinks fit and making such modifications as he thinks proper. Any inquiry under this section will be held by a competent and impartial person appointed by the Minister and in accordance with rules made by him for the purpose. If the Minister is satisfied that the scheme with modifications (if any) made by him will conduce to the more efficient production and marketing of the regulated product he may, after consultation with the Board of Trade, lay before each House of Parliament a draft of the scheme, and if each House resolves that the scheme shall be approved the Minister will make an order approving the scheme in terms of the draft and the scheme will then come into force on the date specified in the order. By Section 2 every scheme must provide for the registration of every producer who makes application for that purpose and must constitute a board to administer the scheme to be composed of elected representatives of registered producers. By Section 3 a scheme will require a poll of the registered producers to be taken within a specified time on the question whether the scheme shall remain in force. If the poll shows that there have voted in favour of the scheme remaining in force, (a) not less than two-thirds of the total number of registered producers voting on the poll, and (b) registered producers who are capable of producing not less than two-thirds of the quantity of the regulated product which all the registered producers voting on the poll are capable of producing, the provisions of the scheme will come into operation at the expiration of what is called "the suspensory period," i.e., a period beginning from the date when the scheme is approved and ending at the expiration of such period (not being less than one month or more than two months) commencing on the date of the declaration of the result of the initial poll as may be provided by the scheme. In any other case the scheme will cease to have effect at the date on which the result of the poll is declared. Section 4 provides that, as soon as practicable after any scheme comes into force, the board

is to publish in newspapers a form of application for registration as a producer under the scheme. Section 5 states that matters may be included in a scheme under the Act for the regulation of marketing and encouragement of co-operation, education and research in respect of the regulated product. They include (amongst other things) power to the board to buy the regulated product and produce such commodities therefrom as may be specified in the scheme and to sell, grade, advertise, &c., the regulated product and any commodity so produced ; provision for requiring registered producers to sell the regulated product or any kind, variety or grade thereof or such quantity thereof as may be determined by the board only to or through the agency of the board ; power to the board to buy and to sell or let for hire to registered producers anything required for the production, adaptation for sale, or sale of the regulated product ; power to the board to regulate sales of the regulated product by any registered producer by determining for a period (i) the kind, variety or grade of the product which may be sold, (ii) the price, below or above which, the terms on which, and the persons to, or through the agency of whom the product or any kind, variety, grade or quantity thereof may be sold ; provision for regulating the manner in which the regulated product or any kind, variety or quantity thereof is to be graded by registered producers or the manner in which the regulated product is to be marked, packed, stored, adapted for sale, insured, advertised or transported ; provision for requiring registered producers to furnish to the board estimates, returns, accounts and other information ; provision for enabling the board to encourage agricultural co-operation, research and education. By Section 6 every scheme is to provide (amongst other things) for requiring that no sale of the regulated product should be made by any producer who is not either a registered producer or a person exempted from registration by the provisions of the scheme ; for exempting from all or any of the provisions of the scheme producers and sales of such classes or descriptions as may be specified in the scheme or determined by the board ; for requiring the board to impose on any registered producer who contravenes any provision of the scheme such monetary penalties as may be specified. Any producer who sells the regulated product in contravention of the provisions of a scheme is liable on summary conviction to a fine not exceeding £5 or on conviction on indictment to a fine not exceeding £200, and in either case to an additional sum not exceeding half the price at which the product was sold. By Section 7 every scheme must provide for the establishment of a fund to be controlled by the board and used for the payment of any moneys required for the operation of the scheme ; for enabling the board to recover from registered

producers contributions to the fund necessary for the operation of the scheme. By Section 8 a contract of which neither the making nor the performance was, at the time the contract was made, prohibited by or under any scheme in force under the Act, will not be void and unenforceable by reason that at the time for performance the performance thereof is so prohibited. By Section 9 the Minister is to appoint a "consumers' committee" and "a committee of investigation" to consider and report to the Minister on schemes, and if it is reported that any provisions of a scheme or any act or omission of a board administering a scheme is contrary to the interests of consumers of the regulated product, or to the interest of any persons affected by the scheme, the Minister may make amendments in, or revoke, the scheme. Section 11 provides, for the purpose of making loans to boards administering schemes under the Act, for the establishment and maintenance of an Agricultural Marketing Fund to be administered and controlled by the Minister of Agriculture and Fisheries and contributed to out of public moneys. The Act by Section 15 enables the Minister to constitute Agricultural Marketing Reorganisation Committees charged with the duty of preparing schemes for regulating the marketing of such agricultural products as the Minister may direct, and when any scheme has been prepared by a Commission the Minister is to take steps to bring the scheme to the notice of the producers concerned. "Agricultural product" in the Act is defined as including "any product of agriculture or horticulture and any article of food or drink wholly or partly manufactured or derived from any such product, and fleeces and the skins of animals."

The Improvement of Live Stock (Licensing of Bulls) Act, 1931 (21 & 22 Geo. 5, c. 43), by Section 1 makes it unlawful, subject to the provisions of the Act and after the appointed day, to keep a bull which has attained the prescribed age unless a licence or permit in respect of the bull is, for the time being, in force under the Act; or unless the bull attained the prescribed age before the appointed day; and any person keeping a bull in contravention of the section is liable on summary conviction to a fine not exceeding £5 in case of first offence or £20 in case of a second or subsequent offence. A person will be deemed to keep a bull if he owns the bull or has the bull in his possession or custody. By Section 2, on application made in the prescribed manner, the Minister of Agriculture and Fisheries will, on payment of the prescribed fee (not exceeding 5s.) and if satisfied that the prescribed conditions as to inspection and marketing have been complied with, grant in the prescribed form to the owner of the bull (a) a licence to keep the bull for breeding purposes, or (b) a permit to keep the bull for any other purpose.

A licence may be revoked if the bull appears to the Minister to be of defective or inferior conformation and likely to beget defective or inferior progeny or is permanently affected with any contagious or infectious disease or with any other disease rendering the bull unsuitable for breeding purposes. Section 3 provides for change of ownership of a bull and duration of a licence or permit. The licence or permit will remain in force (a) until it is revoked or becomes void, or (b) the bull dies or is castrated, or (c) the bull has been outside Great Britain for a consecutive period of 14 days or (d) in the case of a permit the period specified therein expires. Section 6 empowers the Minister after the appointed day to require that any bull which has attained the prescribed age and in respect of which no licence or permit is in force to be slaughtered or castrated. By Section 9 no bull brought to Great Britain from any part of Ireland may be moved alive out of the wharf where it is landed if it has been marked with a mark prescribed under the laws of the Irish Free State or Northern Ireland for signifying that an application has been made under those laws for a licence in respect of the bull which licence has been refused. By Section 13 "the appointed day" in the application of the Act to England means such day not earlier than three years after the passing of the Act as may be appointed by the Minister.

II.—DECISIONS OF THE COURTS.

1. *Landlord and Tenant*.—In *Ware v. Davies* (101 L.J.K.B. 1), a question arose as to the right of a tenant who held a farm by successive tenancies beginning in 1912, in 1918 and 1925 under different landlords, to compensation under the Agricultural Holdings Act, 1923, for temporary pasture laid down by him on land formerly permanent pasture ploughed up by him under the Defence of the Realm Regulations. The farm was originally all permanent pasture. In 1917 the tenant was required by the Glamorgan War Agricultural Executive Committee to plough up and sow with corn two of his fields. He complied with this requirement and subsequently laid down the said fields as temporary pasture. He left the farm in 1930 on a notice to quit and on outgoing claimed compensation under the Agricultural Holdings Act, 1923, for the improvement of laying down to temporary pasture. A County Court Judge on a case stated by an arbitrator held that the tenant had no enforceable claim against the landlord in respect of this item as the original alteration in the nature of the holding was made under emergency legislation and also that the restoration of the holding to its original condition was not an "improvement" within the meaning of the Act. The Court of Appeal held that the claim was enforceable as coming within the exact words of paragraph 28 of Part III.

of the Act of 1923. The tenancy was to be deemed to have commenced for this purpose from 1918, that being the date when a new tenancy commenced with arable fields on the farm.

Rigby v. Waugh's Executors (100 L.J.K.B. 259) was an interesting case arising under Section 26, Subsection 1, of the Agricultural Holdings Act, 1923, which provides that any current and unexpired notice to quit a farm shall be null and void on the making of a contract of sale of the holding "unless the tenant has prior to such contract of sale, by writing, agreed that such notice shall be valid." It was held that an agreement that the notice shall be valid need not be in the express words of the subsection. The landlords of such a holding gave the tenant notice to quit, stating that they contemplated selling the property, and the tenant replied by letter acknowledging the receipt of the notice to quit and continuing "We are sorry to quit and will give up possession of the farm and buildings" on the dates mentioned in the notices to quit. It was held that this was an agreement that the notice should be valid within the meaning of the subsection and in consequence the tenant having quitted under a valid notice to quit was entitled to compensation for disturbance, which the landlords had disputed on the ground that the tenant had not quitted under a valid notice to quit.

An unreported case of *Frost v. Wood* decided at the Oxford Assizes on May 27, 1931, is of some importance. The questions arose upon a contract of sale made with the plaintiff on September 5, 1930, for the sale of certain ricks containing 47 tons of hay at a price of £72 10s., of which £62 10s. was paid at the date of the contract. The tenancy came to an end in consequence of a notice to quit on September 29, 1930. The plaintiff after the termination of the tenancy proceeded to remove the hay until steps were taken by the defendants, the owners of the farm, to stop him doing so on the ground that the plaintiff had no right to the hay and no property therein had passed to him in consequence of Section 31 of the Agricultural Holdings Act, 1923, which provides that when notice has been given to terminate the tenancy of a holding the tenant shall not, subject to any agreement to the contrary, at any time after the date of the notice sell or remove from the holding any hay or straw or roots grown in the last year of the tenancy unless and until he has given the landlord or incoming tenant a reasonable opportunity of agreeing to purchase, on the termination of the tenancy, at its fair market value or such other value as is provided by the contract of tenancy such hay or straw or roots. The hay in this case was grown in the last year of the tenancy and no reasonable opportunity of agreeing to purchase the hay at a fair market value at the termination of the tenancy was given to the landlord or incoming tenant. The question then was whether

this section affected the rights of the plaintiff, who did not know any of the facts, by creating an absolute illegality in the case of a sale in contravention of the section which is good against everybody, however ignorant the purchaser may be that any breach of law has been committed by the tenant. The plaintiff contended that the obligation imposed by the section on the tenant in relation to the landlord is in the nature of a personal right between the two parties unless the purchaser is aware that a breach of the law is committed. This contention prevailed, and Mr. Justice Wright held that the plaintiff was not debarred from claiming that the property in the hay passed to him and was accordingly entitled to claim damages from the defendants for preventing his removal of it.

In a Scottish case of *Sharp v. Thomson* ([1930] S.C. 1002) it was proved in an action brought by the landlord of a farm (about half of which was arable) against the tenant for payment of rent that a lade bringing water to the threshing mill had been damaged and rendered useless owing to the displacement of its banks, caused by a fall of trees blown down in a storm. The lade was essential to the proper enjoyment of the farm as an arable farm. Under the lease the tenant was obliged to maintain the lade in a good and sufficient state of repair and cleanliness. Neither party repaired the damage. The rent of the farm was £135. The tenant maintained that as he had been deprived of the full enjoyment of the subjects let he was entitled to an abatement of rent. The Court held that as the tenant had been deprived of the beneficial use of a material part of the subjects let he was entitled to an abatement. Two of the judges so held on the ground that under the clause in the lease obliging him to maintain the lade he was bound to execute ordinary repairs only but not to make good extensive damage arising from unexpected causes, and the other Judge on the ground that the damage arose from a cause altogether outside the contemplation of the parties.

2. *Income Tax and Rates.*—In *Glanely (Lord) v. Wightman* (145 L.T. 446) a question arose as to the liability of the owner of a stud farm for income tax. He was assessed to income tax under Schedule B in respect of the occupation of land, but he also made an income from fees paid for the services of stallions and he was assessed in respect of these fees under Schedule D. In an appeal against this assessment it was held that as there was a practice of earning the fees this constituted a business separately assessable under Schedule D, and that it was not to be treated as part of the composite undertaking of breeding and racing horses.

Although there have been many decisions on the derating of industrial and freight transport undertakings under the Local

Government Act, 1929, there appears to have been only one reported case in 1931 in which any question arose in respect of the derating of agricultural land under the Act, namely the Scottish case of *Douglas v. Edinburgh assessor* ([1931] S.C. 407), where it was held that a dwelling-house within and occupied with a market garden of 16½ acres should be entered as one property in the Valuation Roll as agricultural land and heritages, notwithstanding the size of the house, which might in the circumstances be regarded as an adjunct of the market garden, just as a farmhouse is regarded as an adjunct of a farm.

In *Morse v. Ouse Drainage Board* ([1931] 1 K.B. 109; 100 L.J.K.B. 238) it was held that a Drainage Board, which has issued a distress to recover a sum unpaid in respect of drainage rates from an owner of land within the area of the Board is not limited to levying distress on such of the landowner's goods as may be found on the land within the area of the Board, but may seize goods of the defaulting landowner in whatever part of the realm of England they may be found.

3. *Stock*.—In *Nethaway v. Brewer* ([1931] 2 K.B. 459; 100 L.J.K.B. 524) it was held that the proviso to Article 1 of the Transit of Animals (Amendment) Order, 1930 (S.R. & O. 1930, No. 702), which excepts from the necessity of cleansing and disinfection, as there prescribed, vehicles carrying animals "making consecutive journeys on any one day between the same two points" applies to consecutive journeys in opposite directions; and therefore a dealer who conveyed lambs to market from his own premises in a motor van and then, having removed the lambs, placed a calf in the van for conveyance from the market to his own premises without having cleansed or disinfected the van, was protected by the proviso.

Arnei v. Paterson ([1931] A.C. 560; 100 L.J.P.C. 161) was an interesting case on the liability of the owners of dogs for sheep worrying. Two dogs belonging to different owners joined in worrying a flock of sheep belonging to the plaintiff and killed and injured several of them. An action to recover damages was brought against the owners of the dogs under the Dogs Act, 1906, and was defended by one of the owners only. It was held that the Dogs Act, 1906, imposed liability on the owner of a dog for the injury done to sheep, and when once the liability under that Act was established the ordinary measure of damages had to be applied, and as the two dogs were acting together each owner was liable for the whole damage because each dog in the eye of the law did the whole damage.

In *Bligh v. Minister of Agriculture and Fisheries* (47 Times L.R. 492) the plaintiff was an owner of pedigree Friesian cattle which became infected with foot and mouth disease. The Minister provisionally decided that it was not a case for slaughter,

but was a case for isolation, which would have caused expense to the plaintiff together with possible risk of losing his stock. Subsequently, however, after certain conversations between the Government inspector and the plaintiff the Minister decided to have the cattle valued and slaughtered. The cattle were valued on behalf of the Minister on a commercial and not a pedigree basis at £993; notice of this valuation was given to the plaintiff and he signed this valuation form. The cattle were slaughtered on the following day and the plaintiff was paid the sum of £993. He did not give within fourteen days as required by clause 39 of the Animals (Transit and General) Order, 1912, a counter-notice that he disputed the valuation. Afterwards the plaintiff claimed from the Minister the difference between £993 and the pedigree value which was agreed at the trial to be £2,162. The claim was based (*inter alia*) on the provision in Section 15, Subsection 2, of the Diseases of Animals Act, 1894, that "the value" of the slaughtered animals should be paid as compensation. It was held that as the plaintiff and the Minister had agreed that the valuation should be on a commercial basis the agreement was binding and the claim of the plaintiff therefore failed.

Dobell & Co. v. Barber & Garratt ([1931] 1 K.B. 219; 100 L.J.K.B. 65) was a case relating to the sale of feeding stuff which turned out to be adulterated. The plaintiffs and the defendants were merchants, both dealing largely in cattle foods. In September, 1929, the defendants sold to the plaintiffs a large quantity of linseed cattle cake. A bank had a lien on the goods and ordered the sale. Cattle which ate the linseed cake became seriously ill and it was found that the cake contained castor-seed mixed with the linseed and that the cattle had suffered from castor poisoning. The plaintiffs had to pay their sub-purchasers damages and they claimed a declaration that on the sale of the cake warranties under Section 2, Subsection 2, of the Fertilisers and Feeding Stuffs Act, 1926, were implied that the cake did not contain castor-seed, and that it was suitable food for cattle. They claimed damages for breach of the statutory warranty. The cake in question came from India and, as there had been trouble in the trade with such cake of Indian manufacture, the defendants at the time of sale were unwilling to give any warranties. The material words of the contract were "The cake is sold *tel quel* in all respects but Ormerod & Fairweather's analysis, for which sellers accept no responsibility is . . . castor free." It was held (1) that the linseed cake was sold by the defendants to the plaintiffs for use as food for cattle within the meaning of Section 2, Subsection 2, of the Fertilisers and Feeding Stuffs Act, 1926, and was therefore sold subject to the warranty implied by the subsection; (2) that the sellers were not protected by

Section 24 of the Act of 1926, which excludes the application of the Act to the sale of an article used as a food for cattle where the sale is in exercise of a statutory power, to enforce a right or to satisfy a claim or lien, or where the sale is made by a sheriff; and (3) that the plaintiffs were entitled to include in their damages for breach of warranty the sums which they themselves had had to pay to the sub-purchasers.

4. *Produce*.—*Lyons & Co. v. Keating* ([1931] 2 K.B. 535; 100 L.J.K.B. 513) was a case relating to the sale of artificial cream under the designation of "cream." The Artificial Cream Act, 1929, by Section 1, Subsection 1, provides that "no person shall sell or offer or expose for sale for human consumption under a description or designation including the word 'cream' any substance purporting to be a cream or artificial cream as defined in this Act unless . . . (a) the substance is cream as defined in this Act." The defendants were convicted by justices upon informations that they had contravened the above section by selling or exposing for sale articles for human consumption purporting to contain a substance under the designation of "cream," which in fact was not "cream" as defined in the Act. It appeared from the evidence that the sales were of confectionery described in the one case as "cream-filled" and in the other as a "Cream sandwich (vanilla filled)." The appeals against the conviction were allowed, for the Court held that, looking at the Artificial Cream Act, 1926, as a whole, it was plain that the statute dealt with the sale of cream or artificial cream *simpliciter*. The essential words were "any substance purporting to be" not "purporting to contain" cream or artificial cream, and there was no evidence on which the justices could find that what had been sold purported to be "cream" within the meaning of the Artificial Cream Act, 1926.

In an Irish case of *Murphy v. Nicholson* ([1931] K.R. 582) a question arose as to whether a sale of milk complied with the provisions of the Sale of Food and Drugs Act, 1875, as amended by the Sale of Food and Drugs Act Amendment Act, 1879. The defendant was a shareholder in a co-operative dairy society and he and other suppliers of milk delivered daily to the creamery of the society quantities of milk. The quantity of milk delivered by each supplier was recorded by weight in pounds (dependent on the number of gallons) and the official of the creamery took a sample of each delivery, tested it, and ascertained its content of butter-fat. In return for the milk delivered by him the defendant received from the creamery (a) at the end of every month a cash payment per pound of milk delivered calculated on the average percentage of butter-fat contained in the milk delivered during the month—the greater the content of butter-fat, the higher the price paid; and (b) each day a quantity of

separated milk which was determined in accordance with the rules of the Society and was proportionate to the quantity of milk delivered by the defendant to the creamery, or, instead, a cash payment. A sample of the defendant's milk taken by an inspector of food and drugs when the milk was in course of delivery to the creamery was found on analysis to be inferior to the standard prescribed by Regulations 1 and 2 of the Sale of Milk (Ireland) Regulations, 1901, and the defendant was charged with selling to the creamery to the prejudice of the purchaser within the meaning of the Sale of Food and Drugs Act, 1875, as amended by Section 3 of the Sale of Food and Drugs Act Amendment Act, 1879, an article of food, to wit milk, which was not of the nature, substance and quality demanded by the purchaser. No evidence was given by the defendant to rebut the presumption of abstraction or adulteration which applied to the sample by reason of the regulations. The District Judge dismissed the summons, being of opinion that, as the creamery was only to pay for the milk delivered a price proportionate to the percentage of butter-fat contained in it, there was no demand by the creamery as purchaser for milk of any particular nature, substance or quality and consequently no prejudice to the creamery from the sale; and that the Sale of Food and Drugs Acts and the Sale of Milk (Ireland) Regulations, 1901, did not apply to the sale. It was, however, held by the High Court that the District Justice was wrong in law in dismissing the summons as, although the price paid by the creamery varied with the quality of the milk supplied, the contract contemplated the supply of genuine milk and the milk of which the sample was taken was not genuine milk as defined by the Sale of Milk (Ireland) Regulations, 1901.

In *Prosser v. Mountain Ash Urban Council* ([1931] 2 K.B. 132; 100 L.J.K.B. 266) a local authority gave notice to a registered purveyor of milk by retail to appear and show cause why they should not remove his name from the register in respect of a certain farm for alleged breaches of the requirements of the Milk and Dairies Order, 1926. Before the date at which he was required to appear before the local authority the tenancy of the farm was transferred to the appellant, and notice was also given to him to show cause why the name of his predecessor should not be removed from the register. He attended before the local authority and was heard, but the local authority resolved to remove the name of the previous tenant from the register and it was clear that such removal was not on the ground of the change of tenancy but because of the condition of the premises. It was held that the new tenant was a "person aggrieved" by the decision and therefore entitled to appeal to a Court of summary jurisdiction. He was aggrieved by the decision that the

premises, which he had taken over as they stood from the former tenant, were not fit to be used as a dairy, as he was obviously a person seeking to be registered as a purveyor of milk there.

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AGRICULTURAL STATISTICS, 1931.

(The Society is again indebted to the Ministry of Agriculture and Fisheries for its kindness in supplying, for inclusion in the *Journal*, the usual detailed and comparative tables of the latest agricultural statistics. For fuller information than can be given in the limited space available here, the Department's own admirable series of Reports on Agricultural Statistics, together with the weekly "*Agricultural Market Report*," should, of course, be consulted.—ED.)

I.—CLASSIFICATION OF AGRICULTURAL HOLDINGS IN ENGLAND AND WALES.

SINCE the following brief notes on the results of the latest classification of agricultural holdings refer to 1930, they do not properly belong to a review of agricultural statistics in 1931. As, however, the subject is one of exceptional interest to agriculturists and others concerned with the industry, and the information has only recently become available, its inclusion here may not be regarded as inappropriate. A full account of the results of the enquiry will appear in due course in the official report on the Agricultural Census of 1930-31, and in the meantime for those who desire more detailed information than can be provided in this review, reference can be made to the *Agricultural Market Report* for October 30 last.

The total number of agricultural holdings above 20 acres in extent in respect of which the 1930 classification was made amounted to 215,200, covering an area of 23,744,000 acres, or about 94 per cent. of the total area under crops and grass. The corresponding figures for 1925—when the previous classification was made—were 216,700 holdings and 24,128,000 acres. Between these five years, there has been a tendency for the medium-sized holdings to increase numerically at the expense of both the smallest and largest holdings. Thus, the number in the 20-50 acre group declined by 1,452 to 75,579, whereas the 60,979 holdings in the 50-100 acre group represented an increase of 1,000; in the next group—those holdings of from 100 to 150 acres—a small increase of 81 brought the total to 31,763, but above 150 acres reductions were general.

As a corollary to the drop of well over a million acres in arable land between 1924 and 1930, holdings classified as arable fell

by 3,299 to 36,284, and the area covered by 706,800 acres. The heaviest individual reduction in acreage occurred in the 150-300 acre group, and amounted to 942 holdings covering 207,300 acres, and the smallest in the 20-50 acre group with a loss of 665 holdings and 23,500 acres. Mixed holdings also showed a substantial reduction, the total fall being 8,749 holdings and 907,700 acres. Here again the decline was most pronounced in the 150-300 acre group, but the smallest was in the group comprising farms over 500 acres in extent. As regards pasture farms, the number increased by 10,529 covering 1,230,000 acres, all the groups comprising this class showing appreciable advances, which were heaviest in the 150-300 acre group, with a gain of 1,897 holdings and 395,100 acres.

A summary of the results of the Census reveals that the continued turning over of arable land to pasture caused the number of arable holdings in 1930 to fall to 17 per cent. of the total holdings over 20 acres, as compared with 18 per cent. in 1924, while mixed farms declined from 34 to 30 per cent. Pasture farms, on the other hand, accounted for 53 per cent. of the total in 1930 as against 48 per cent. in 1924.

II.—ACREAGE.

Particulars of the acreage under the principal crops in England and Wales in 1931 are given in Table I, the statistics having been compiled from the returns made by occupiers of agricultural holdings above one acre in extent on June 4.

The total area of agricultural land covered by the returns was 30,592,000 acres, or 82,000 acres (0·3 per cent.) less than in 1930. The land in use for crops and pasture (excluding rough grazings) has been steadily diminishing in extent during most of the post-war years, and on June 4, 1931, a further loss of 102,000 acres (0·4 per cent.) was revealed. Thus the amount of the annual reduction seems not only to show no signs of being arrested but on the contrary is gaining momentum, for the fall amounted to 68,000 acres between 1928 and 1929 and to 59,000 acres between 1929 and 1930. As compared with the average of 1912 to 1914, the latest total of 25,278,000 acres is about 1,860,000 acres (6·9 per cent.) less. The area of rough grazings continued to increase, the figure recorded for the year under review (5,314,000 acres) being 20,000 acres (0·4 per cent.) more than in the preceding twelve months. This advance points to a more rapid expansion of rough grazing land, partly at the expense of pasture land, since the increase between 1929 and 1930 was only 10,000 acres. In 1929, however, the rise amounted to 27,000 acres and in 1928 to over 50,000 acres.

There was a severe fall in the arable area, the total of 9,582,000 acres representing a loss of 251,000 acres (2·6 per cent.) from

June 4, 1930 ; further, the portion of the arable acreage returned as bare fallow rose by 62,000 acres. During the three pre-war years 1912-14, the average area of arable land was 11,131,000 acres, so that since then there has been a drop of 1,549,000 acres (13·9 per cent.). Permanent grass occupied 149,000 acres more than in 1930, a decline of 267,000 acres in the area reserved for hay being more than counterbalanced by a rise of 416,000 acres in grass not for hay.

Taking a broad view of the relationship between arable land and the total area under cultivation, it is observed that the slight, but steady, shrinkage of the proportion of the former appears to be consistently maintained, arable land in 1931 accounting for about 38 per cent. of the total area under crops and grass, as compared with 38·75 per cent. in 1930, 39 per cent. in 1929, 40 per cent. in 1928 and 41 per cent. in the years immediately prior to the war.

Turning to the individual crops, the extent of land devoted to *Wheat* growing was greatly curtailed, a loss of 149,000 acres (11·1 per cent.) being recorded. The latest total of 1,197,000 acres is easily the lowest on record, and as compared with pre-war years, shows a reduction of 594,000 acres, or practically one-third. The downward movement has been in evidence in most post-war years ; true, a comparatively substantial revival took place between 1925 and 1927, when the wheat acreage rose by 137,000 acres, but the fall re-asserted itself in 1928 and 1929, followed by a slight recovery in 1930. During the twelve months under review, the heaviest shrinkages occurred in the East Midlands, where 30,000 acres were lost. In the North-Eastern Counties, there was a net reduction of 19,000 acres, Lincolnshire alone returning 20,000 acres less than in 1930. Of the 42,000-acre fall in the Eastern Counties, Essex accounted for 13,800 acres, but on the other hand 3,600 acres more were sown in Norfolk—which was one of the five counties where a loss was not recorded.

It will be recalled that in 1930, the decline of 100,000 acres in the *Barley* acreage created a new low record for this crop. A trifling addition of 9,000 acres (0·9 per cent.) in the ensuing year failed to bring the total to within striking distance of any year previous to 1930. At the end of the war, over one-and-a-half million acres were devoted to barley growing and by 1920 the total had reached 1,637,000 acres, which was the highest level recorded since the 1,640,000 acres of 1904. The reduction in the last five years is close on 120,000 acres (10·4 per cent.), while as compared with the average of 1912 to 1914, the latest figure of 1,029,000 acres is 478,000 acres (31·7 per cent.) less. Additions to the barley acreage in 1931 were confined almost entirely to the Eastern and North-Eastern Counties ; Norfolk

gained 10,000 acres, Suffolk 8,000 acres, and Essex and the East Riding of Yorkshire 6,000 and 4,000 acres respectively.

Oats suffered a severe set-back in 1931, and following as it did a drop of 75,000 acres between 1929 and 1930, it is necessary to go as far back as 1874 to find a smaller acreage than the 1,652,000 acres recorded during the year under review. The Isle of Ely was the sole county to register an increase, the heaviest reductions occurring in the Eastern and South-Eastern Counties, where 24,000 and 20,000 acres respectively less were put under oats, the reduction representing in each case 11 per cent. of the 1930 area; in the North-West there was also a decline of 20,000 acres, or 8 per cent. The total fall in England and Wales amounted to 127,000 acres (7 per cent.). It may be noted that during the first twenty-two years of the present century, the acreage of oats was above the 2,000,000 acre level on all but two occasions; but with the exception of 1924, the acreage in each of the subsequent nine years has been below that figure.

Taken together, the three main cereal crops occupied 3,878,000 acres in 1931 as compared with 4,145,000 acres in 1930—a reduction of 267,000 acres, or 6·4 per cent. Under the stimulus of the Food Production Campaign in 1918, the area devoted to wheat, barley and oats totalled 6,838,000 acres, while the pre-war average came out at 5,290,000 acres.

The area given to *Mixed Corn* was 122,300 acres—or 8,400 acres (6·4 per cent.) less than in 1930. During the preceding year there was a fall of about 9,000 acres (6·5 per cent.). *Rye* failed to maintain the larger acreage returned in 1930, the total of 32,700 acres representing a reduction of 11,300 acres (25·7 per cent.); the latest figure is the lowest on record, with the exception of that for 1928.

In the case of *Beans*, the increase of close on 19,000 acres in 1930 was almost entirely offset by a decrease of over 17,500 acres during the year under review. The area harvested as corn accounted for most of the shrinkage, the acreage falling by 16,000 acres (9·9 per cent.) to 145,500 acres, while the area of beans for picking or cutting green amounted to 12,600 acres as compared with 14,400 acres in 1930. *Peas* also showed a decline, although it was of small dimensions. The area to be harvested as corn was 2,700 acres (3·5 per cent.) less on the year, but that for picking while green rose by 1,000 acres (1·8 per cent.) to 57,400 acres. The total area of 132,600 acres under the crop thus represented a net reduction of 1,700 acres.

The combined acreage occupied by the two pulse crops on June 4, 1931 was 290,700 acres as compared with 310,200 acres in 1930—a decline of 19,500 acres, or 6·3 per cent.

Following the heavy reduction between 1929 and 1930 of about 95,000 acres in the area devoted to *Potatoes*, which brought

the total to the lowest point recorded since 1910, the comparatively substantial rise of 22,000 acres (5·2 per cent.) occurred in 1931. The total of 446,900 acres was, nevertheless, apart from that in 1930, lower than in any year subsequent to 1916. During 1912 to 1914 potatoes were grown on about 455,000 acres, so the acreage for 1931 was close to the pre-war average. The increase in the period under review was confined to England; two-thirds of it occurred in the Eastern and North-Eastern Counties, Lincolnshire contributing 6,000 acres, the Isle of Ely 4,000 acres, and Essex and Norfolk 1,000 acres each.

One of the most striking features of the acreage statistics during the present century has been the continued decline in the amount of land given over to *Turnips* and *Swedes*. Between 1900 and 1910, the area fell from 1,223,000 acres to 1,123,000 acres (*i.e.*, by 8 per cent.), the decade closing with a slight revival. The following ten years brought a further fall of 132,000 acres (12 per cent.) while from 1920 to 1930 the downward movement gained momentum, the loss amounting to 320,000 acres (32 per cent.). The most recent statistics show that the acreage of turnips and swedes has slumped still further—by 50,800 acres (7·6 per cent.) to 620,600 acres, thus creating a new low record for the crop. Yorkshire grew less by 19,000 acres, Lincolnshire 6,000 acres, Hampshire 3,000 acres and Norfolk 2,500 acres.

Mangolds, too, were grown on a smaller acreage for the ninth year in succession, the 1931 total of 270,700 acres being 17,600 acres (6·1 per cent.) below the level recorded in the preceding year, and the smallest returned since 1868. All the Northern counties grew more mangolds, but reductions were general throughout the rest of the country, the most prominent being 1,800 acres in Essex, 1,600 acres in Norfolk and 1,500 acres in Lincolnshire.

The total acreage of the principal fodder roots in 1931 was, therefore, 891,300 acres as compared with 959,700 acres in 1930—a drop of 68,400 acres, or 7 per cent. The corresponding figures for 1918 and 1912 to 1914 were 1,312,000 acres and 1,506,000 acres respectively.

As regards *Hops*, there was a shrinkage of close on 400 acres, as against a drop of 4,000 acres between 1929 and 1930. Increases of 122 acres (3·3 per cent.) were returned from Hereford, 98 acres (5·7 per cent.) from Worcester and a small one of 10 acres (6·6 per cent.) in Surrey, but these were more than offset by reductions of 270 acres (2·3 per cent.) in Kent, 230 acres (13·7 per cent.) in Sussex and 117 acres (13·5 per cent.) in Hampshire. Of the total area cultivated in England, 11,550 acres (58·9 per cent.) were situated in Kent, 3,810 (19·4 per cent.) in Hereford, 1,830 acres (9·3 per cent.) in Worcester, and 1,450 acres (7·4 per cent.) in Sussex.

There was an addition of 158,000 acres (6·5 per cent.) to the area under *Clover and Rotation Grasses*; of the total of 2,581,000 acres, 1,726,000 acres were returned as intended for hay, or 131,000 acres (8·2 per cent.) more than in 1930, while the area for grazing rose by 27,000 acres (3·3 per cent.) to 855,000 acres.

The growing of *Sugar Beet* in this country appears to be passing through a period of uncertainty. A steady expansion in acreage was noticeable up to 1927, but in the ensuing year a drop of 50,000 acres occurred. Between 1928 and 1929, however, there was a marked recovery, the total area advancing by 30 per cent., followed by a striking increase of 117,000 acres (over 50 per cent.) in 1930. The 1931 figures, however, show a reduction of 114,000 acres (32·8 per cent.) on those of 1930. Of this, 85,000 acres were in the Eastern and North-Eastern Counties, Norfolk withdrawing 33,000 acres, Suffolk 17,000 acres, Lincolnshire 13,000 acres and Ely 10,000 acres.

As regards the market gardening side of the industry, many vegetables were grown on larger areas. *Cabbage* occupied 5,000 acres and *Brussels sprouts* 9,400 acres more, while *Caruliflowers* and *Broccoli* gained 1,200 acres and *Carrots* 500 acres. In the case of *Onions*, however, a shrinkage of 500 acres was recorded. The acreage under *Lucerne* was 6,300 acres (15·8 per cent.) greater on the year, but *Vetches* and *Tares* declined by 11,000 acres (14·6 per cent.) as against an increase of 6,700 acres (9·9 per cent.) between 1929 and 1930. *Mustard for Seed* was sown on 3,700 fewer acres.

Rather more variation than usual was noticeable in the area of *Fruit*, a drop of 6,700 acres (2·1 per cent.) being recorded. Of this, 4,200 acres (6·3 per cent.) were in small fruit, and 2,500 acres (1·0 per cent.) in orchard land. Orchards were reduced in Middlesex by 700 acres, in the South-Eastern Counties by 600 acres, and in the West Midlands by 1,200 acres (including 500 acres in Worcester and 360 acres in Hereford). The acreage of small fruit in Kent fell by 1,500 acres and in Norfolk by 600 acres.

III.—LIVE STOCK.

The number of *Horses* on agricultural holdings (Table I) has been steadily falling since 1921, and the latest statistics reveal a continuation of the downward movement, the total of 938,400 being 22,900 (2·4 per cent.) fewer than in 1930. The rate of decrease, however, shows definite signs of slowing up; during the first half of the last decade the extent of the loss was over 250,000, whereas in the second half it was under 200,000, most of which occurred between 1926 and 1928. During the period covered by this review, horses used for agricultural purposes numbered 666,500 or 16,300 (2·4 per cent.) fewer than on June 4,

1930, and accounted for the largest share in the general reduction. A year earlier, however, the drop was as great as 24,000 (3·4 per cent.). Unbroken horses declined by 2,500 to 123,500, the drop in the case of foals being only 100 (0·3 per cent.). The number of "other" horses showed a decrease of 4,100 (2·7 per cent.) to 148,400.

For the first time since 1927 an increase was recorded in the *Cattle* herds of the country. Between that year and 1930, there was a reduction of 425,000, but the returns made on June 4, 1931, show an advance of 214,500 (3·7 per cent.) to 6,064,300. As compared with the position just before the war, the latest total is 252,000 (4·3 per cent.) greater, but is still some way below the 6,200,000 recorded in 1918. Over one-half of the total increase occurred in the dairy herds; cows and heifers in milk showed only a small addition of 9,100 (0·4 per cent.), but in-calf cows rose by 33,100 (11·5 per cent.) and in-calf heifers by 72,500 (20·5 per cent.). "Other" cattle aged two years and over were exceptional in that their numbers decreased by 35,300 (3·6 per cent.), but those of one year and under two, increased by 13,200 (1·2 per cent.) and those under twelve months by 121,900 (11·2 per cent.). It is interesting to note that the additions to the dairy herds were not confined to one part of the country, but were spread over most counties, the relatively most pronounced increase being one of 8 per cent. in the East Midlands.

As regards *Sheep*, a substantial increase of 1,429,600 (8·8 per cent.) brought the flocks to a level higher than in any year since 1916, and the latest figure of 17,745,400 is about 260,000 (1·5 per cent.) above the average of the three pre-war years. From 1917 onwards there was a marked slump in sheep-breeding, a fall of four-and-a-half million occurring between that year and 1922. Subsequently, a recovery took place and the numbers climbed steadily until 1927, when the flocks totalled 17,072,000. There was a renewal of the downward movement in the two following years, but a rise of 223,000 took place in 1930. The latest increase was spread over all classes, 445,000 (6·5 per cent.) more breeding ewes being recorded, while "other" sheep of one year and over rose by 391,200 (16·3 per cent.) and lambs by 593,400 (8·4 per cent.).

The heavy decrease in the number of *Pigs* on agricultural holdings in 1929 and 1930 was followed by a substantial recovery during the year under review, the 2,778,000 recorded in June last representing a rise of 467,000 (20·2 per cent.) on the twelve months. It was, moreover, one of the largest totals on record. The pig population given in the 1931 returns was over 400,000 (17·7 per cent.) greater than the average of 1911-13. The advance during the year under review was due mainly to a rise

of 381,500 (19·1 per cent.) in the number of "other" pigs, a large proportion of which occurred in the Northern counties, where there was an addition of about 27 per cent. Breeding sows increased by 85,900 (27·2 per cent.), which was shared by all counties, the advances being relatively greatest in the Eastern, North-Eastern, West-Midland and South-Western areas.

Some interesting facts emerge from the returns made of the numbers of the various descriptions of *Poultry* kept on agricultural holdings of more than one acre in extent. It should be borne in mind, of course, that these statistics are not complete records, inasmuch as they make no allowance for poultry kept on allotments and in back gardens, most of which, of course, would be fowls.

The increasing popularity of commercial egg-production in this country is clearly shown by the returns made on June 4. The latest total of the number of *Fowls* is 52,561,000—or 4,660,000 (10 per cent.) more than in 1930, and compares with the 29,026,000 recorded in 1913. During the last ten years there has been an uninterrupted series of advances, most of which have been of a substantial character. *Ducks*, *Geese* and *Turkeys* do not appear to be showing any long-sustained increase or decrease. The 1931 figure for ducks, at 2,500,000 is 117,000 more than in the preceding year, and about 312,000 in excess of the level of 1913, but some 200,000 below the totals of 1926 and 1927. The numbers of geese fell by 51,000 to 552,000, this being the fourth consecutive decline to be recorded. *Turkeys* showed the substantial reduction of 124,000 (19 per cent.), the latest total of 543,000 being less than in any year since 1921, and comparing with 652,000 in 1913. As recently as 1929, the figure stood at 696,000—the highest returned since the statistics have been regularly collected.

IV.—PRODUCE OF CROPS.

Figures of the production and yield per acre of the principal crops are given in Table II. (See page 292.)

The *Wheat* crop yielded rather more favourably than in 1930, the estimate of 16·1 cwt. per acre in 1931 comparing with 15·9 cwt. in 1930 and a ten-year average of 17·7 cwt. Even so, this did not compensate for the heavy drop in acreage, and the total production declined by 109,000 tons (10 per cent.) to 961,000 tons. This is easily the lowest level reached during the past twenty years, and compares with 1,634,000 tons in 1914 and the record of 2,339,000 tons harvested in 1918.

Barley also fared rather better during the year under review, the yield per acre coming out at 15·0 cwt. to the acre as against 14·4 cwt. in 1930 and an average of 15·5 cwt. during the preceding ten years. As the acreage figures showed an advance of

TABLE II.—Total Produce and Yield per Acre of the Corn, Hay and Root Crops in England and Wales in 1931, with Comparisons for 1930, and the Average Yield per Acre of the Ten Years 1921-30.

Crops	Total Produce		Acreage		Yield per Acre		
	1931 §	1930	1931 §	1930	1931§	1930	Average of the Ten Years, 1921-30
	Thousands of Cwt.	Thousands of Cwt.	Acres	Acres	Cwt.	Cwt.	Cwt.
Wheat	19,228	21,407	1,196,697	1,346,135	16.1	15.9	17.7
Barley	15,441	14,733	1,029,141	1,020,201	15.0	14.4	15.5
Oats	24,798	26,829	1,651,606	1,778,115	15.0	15.1	14.7
Mixed Corn	1,684	2,005	121,134	129,968	13.9	15.4	15.0
Beans	2,403	2,784	144,939	161,465	16.6	17.2	16.2
Peas	1,046	1,149	74,906	77,890	14.0	14.8	14.1
	Thousands of Tons	Thousands of Tons					
Seeds Hay*	2,605	2,329	1,726,444	1,595,045	30.2	29.2	27.6
Meadow Hay† . . .	5,323	5,575	4,777,843	5,050,936	22.3	22.1	19.8
Potatoes	2,407	2,743	446,772	424,660	5.4	6.5	6.3
Turnips and Swedes .	6,979	7,931	618,753	670,224	11.3	11.8	12.3
Mangolds	4,523	5,438	269,665	287,902	16.8	18.9	19.1

* Hay from Clover, Sainfoin, and Grasses under rotation.

† Hay from Permanent Grass.

§ Subject to revision.

about 9,000 acres, the total production was over 30,000 tons (4.5 per cent.) greater at 772,000 tons. Just before the war, round about 1,200,000 tons of barley were produced annually in England and Wales, so that the latest figure is still 428,000 tons (35.7 per cent.) less.

In the case of *Oats*, the yield, at 15 cwt. per acre, was a trifle under the previous year's level, but was nevertheless well above the ten-year average. Cornwall and Dorset were the most prominent counties concerned with the falling-off, the reductions being $2\frac{3}{4}$ and $2\frac{1}{2}$ cwt. respectively per acre. The acreage returned on June 4 was 127,000 acres less than at the corresponding date in 1930, and the out-turn fell by about 102,000 tons (7.5 per cent.) to 1,240,000 tons.

The aggregate production from the three main cereal crops was 175,000 tons (5.6 per cent.) less on the year at 2,973,000 tons, as compared with 3,800,000 tons in 1929, 4,158,000 tons in 1914 and 5,500,000 tons in 1918.

Following the particularly good yield in 1930, *Beans* showed a decline of 0.6 cwt. to 16.6 cwt. per acre—or 0.4 cwt. in excess of the ten-year average, which, coupled with a drop of over 17,500 acres in the area sown, caused production to amount to

only 120,000 tons—or 19,000 tons (13·7 per cent.) less than in 1930.

Peas were not a very satisfactory crop in 1931, the yield being only 14·0 cwt. per acre as against 14·8 cwt. in 1930, and the total output fell by over 5,000 tons to 51,000 tons.

In the light of subsequent events, 1931 will probably be remembered for its unfavourable *Potato* crop. The yield per acre fell from 6·5 tons to 5·4 tons per acre, and was one of the lowest recorded during the past decade. In spite of the sharp rise in acreage, the total production consequently declined compared with 1930 by 336,000 tons to the unusually low level of 2,407,000 tons. In 1914, the output of potatoes amounted to 2,953,000 tons, while the highest point reached during recent years was the 4,209,000 tons of 1918.

Turnips and *Sweedes* also fared badly, yielding only 11·3 tons to the acre as compared with 11·8 tons in 1930 and a ten-year average of 12·3 tons. Since the area devoted to the crop showed a decrease of over 50,000 acres, the total out-turn fell by 952,000 tons (12 per cent.) to 6,979,000 tons—the lowest level recorded since 1921, when, on a yield of no more than 7·4 tons per acre, the production amounted to only 6,608,000 tons.

As regards the other main fodder root, *Mangolds*, many counties returned under-average yields, and over the country as a whole the yield came out at only 16·8 tons per acre, as compared with 18·9 tons in 1930 and a ten-year average of 19·1 tons. On an acreage smaller by over 18,000 acres, the total production amounted to 4,523,000 tons—or 915,000 tons (16·8 per cent.) less on the year.

Sugar Beet fared badly, the estimated yield of 7·4 tons per acre being one ton lower than in 1930. As the acreage under the crop was substantially reduced, it is anticipated that the aggregate output of washed and topped beet would not exceed two million tons.

The harvesting of *Hay* in 1931 was carried on under exceptionally difficult conditions, and as a result of the unfavourable weather, much of the crop, although abundant, was of poor quality. In addition, very few second cuts were taken. The yield of seeds hay was estimated at 30·2 cwt. to the acre and of meadow hay at 22·3 cwt., being in both cases above the previous year's figures and also the ten-year averages. The total output of hay amounted to 7,933,000 tons as compared with 7,904,000 tons in 1930.

Calculated on the acreage actually returned on June 4 (as distinct from the area picked), the yield of *Hops* (see Table III) in 1931 was very low at 8·7 cwt. to the acre—or 3·9 cwt. below that in 1930, and 3·5 cwt. under the ten-year average. Production showed a heavy drop in all areas, and over England as

TABLE III.—Hops:—*Total Production in the years 1931 and 1930, with the Acreage and Yield per Statute Acre in each County of England in which Hops were grown; and the Average Yield per Acre of the Ten Years 1921–30.*

Counties, etc.	Acreage		Total Produce		Yield per Acre		
	1931 †	1930	1931 †	1930	1931 †	1930	Average of the Ten Years, 1921–30
	Acres	Acres	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
TOTAL FOR ENGLAND . . .	19,536	19,997	169,000	253,000	8·7	12·6	12·2
Kent { East	2,556	2,685	28,300	35,900	11·1	13·4	13·9
{ Mid	3,560	3,606	30,500	48,400	8·6	13·4	13·7
{ Weald	5,368	5,529	53,000	70,700	9·8	12·8	12·1
{ Total, Kent	11,484	11,820	111,800	155,000	9·7	13·1	13·0
Hants	751	867	2,800	6,800	3·7	7·9	11·5
Surrey	146	140	300	1,550	2·2	11·3	11·5
Sussex	1,461	1,680	13,800	22,600	9·1	13·4	12·2
Hereford	3,817	3,688	23,800	48,800	7·4	13·2	10·4
Worcester	1,811	1,782	11,900	17,800	6·6	10·0	10·0
Other Counties*	66	70	600	950	10·8	13·4	9·4

* Shropshire, Gloucester and Berkshire.

† Subject to revision.

a whole amounted to 169,000 cwt. as against 253,000 cwt. in 1930, i.e. a decline of over 33 per cent. In Kent there was a fall of 43,200 cwt. (28 per cent.) and in Hereford 20,500 cwt. (42 per cent.), while the crop in Hampshire and Surrey was a virtual failure.

V.—PRICES.

The severe depression in prices of agricultural produce dating from early in 1930 became intensified during the whole of the succeeding year, and the annual average index number calculated by the Ministry of Agriculture came out at only 20 per cent. above the pre-war base years 1911–13, as compared with 34 per cent. in 1930 and 44 per cent. in 1929 (see Tables IV and V). This level was the lowest reached since 1914, when the index stood at one per cent. above the pre-war average. With the notable exceptions of potatoes and hops, practically all descriptions of farm produce contributed to the fall of 14 points in the general index number. The real extent of the depression can best be gauged from a study of the prices of wheat, oats, hay and wool (at Bradford), which were below pre-war for the whole of the twelve months, barley and bacon pigs for five months, and eggs during December. The live stock side of the industry also encountered the full force of the "economic blizzard," but since prices during 1930 were maintained at a relatively high

TABLE IV.—Percentage Increase or Decrease * in the Monthly Prices of Individual Descriptions of Agricultural Produce during the Year 1931, as compared with the Corresponding Month of 1911-13.

Commodity	Month												Year
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Wheat	-24*	-31*	-30*	-32*	-23*	-24*	-23*	-21*	-37*	-24*	-10*	-14*	-24*
Barley	3	3	-3*	-2*	-10*	-9*	-19*	NH	18	8	6	2	NH
Oats	-16*	-18*	-18*	-15*	-11*	-10*	-12*	-8*	-17*	-11*	-2*	-1*	-12*
Fat Cattle	27	25	23	20	19	23	29	29	22	18	15	10	22
" Sheep	50	37	30	37	40	45	38	38	31	28	13	6	33
Bacon Pigs	34	31	24	23	21	11	NH	-5*	-10*	-12*	-12*	-13*	7
Pork Pigs	57	51	46	40	33	20	10	5	2	3	2	3	23
Dairy Cows	33	32	30	28	24	23	27	25	20	22	23	25	26
Store Cattle	28	29	25	23	25	28	31	31	23	18	18	17	27
" Sheep	48	35	31	31	23	45	53	40	33	18	12	1	31
" Pigs	114	98	75	63	52	41	31	32	29	31	29	20	51
Eggs	23	17	24	18	7	2	19	17	20	29	23	-7*	16
Poultry	47	44	47	42	63	52	44	31	30	30	27	39	44
Milk	62	62	50	53	47	48	52	55	57	19	21	50	47
Butter	14	16	18	15	8	7	10	10	7	5	5	10	11
Cheese	21	19	23	24	22	25	28	23	8	8	6	11	16
Potatoes	71	73	70	82	85	100	79	45	85	110	131	159	88
Hay	-8*	-10*	-9*	-10*	-10*	-11*	-13*	-12*	-14*	-19*	-22*	-23*	-14*
Wool (at Bradford)	-22*	-25*	-20*	-16*	-21*	-32*	-34*	-31*	-30*	-24*	-21*	-21*	-48*†

* Decrease.

† At country wool sales.

TABLE V.—Percentage Increase in the Monthly and Yearly Prices of Agricultural Produce as a whole in each Year from 1922 to 1931 as compared with the Corresponding Periods 1911-13.

	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931
January	71	67	60	71	58	49	45	45	48	30
February	75	63	61	69	53	45	43	44	44	26
March	73	59	57	66	49	43	45	43	39	23
April	66	54	53	59	52	43	51	46	37	23
May	69	54	57	57	50	42	54	44	34	22
June	64	49	56	53	48	41	53	40	31	23
July	67	50	53	49	48	42	45	41	34	21
August	68	52	57	54	49	42	44	52	35	21
September	59	52	61	55	55	43	44	52	42	20
October	61	50	66	53	48	40	39	42	29	13
November	63	51	66	54	48	37	41	44	29	12
December	61	55	65	54	46	38	40	43	26	17
Year	69	57	61	59	51	44	47	44	34	20

TABLE VI.—Average Prices of British Corn per cwt. (of 112 Imperial Standard lb.)¹ in England and Wales as ascertained under the Corn Returns Act, 1882, and the Corn Sales Act, 1921, in each week of the year 1931.

1931. Received in the Week Ended		Wheat	Barley	Oats
		s. d.	s. d.	s. d.
January	3	5 11	8 3	5 10
"	10	5 9	8 1	5 8
"	17	5 7	8 1	5 9
"	24	5 6	8 7	5 10
"	31	5 5	8 6	5 9
February	7	5 3	8 7	5 11
"	14	5 2	8 5	5 10
"	21	5 1	8 3	5 9
"	28	5 1	8 1	5 10
March	7	5 2	8 1	5 9
"	14	5 2	7 8	5 10
"	21	5 2	7 11	5 11
"	28	5 2	7 3	5 10
April	4	5 2	7 5	6 1
"	11	5 3	8 1	6 0
"	18	5 3	7 3	6 0
"	25	5 3	7 3	6 0
May	2	5 5	7 1	6 3
"	9	5 7	6 9	6 5
"	16	5 8	6 9	6 8
"	23	5 10	7 5	6 8
"	30	5 10	6 7	6 11
June	6	6 0	8 2	7 0
"	13	5 11	6 5	6 10
"	20	6 0	6 3	6 8
"	27	6 1	6 5	6 9
July	4	6 2	5 11	6 8
"	11	6 1	6 6	6 9
"	18	6 4	5 7	6 11
"	25	6 5	6 4	6 8
August	1	6 5	6 4	6 8
"	8	6 6	6 9	6 9
"	15	6 6	7 6	6 5
"	22	6 4	8 5	6 2
"	29	6 3	9 2	6 3
September	5	5 1	10 2	5 9
"	12	4 9	10 2	5 8
"	19	4 8	9 0	5 7
"	26	4 6	9 5	5 7
October	3	4 10	9 3	5 9
"	10	5 4	9 3	6 2
"	17	5 9	9 6	6 4
"	24	6 1	9 0	6 5
"	31	6 5	9 1	6 6
November	7	6 7	9 2	6 6
"	14	6 10	9 0	6 10
"	21	6 10	9 1	7 0
"	28	6 9	8 10	7 0
December	5	6 7	8 5	7 0
"	12	6 5	8 6	7 2
"	19	6 4	8 7	6 10
"	26	6 1	8 3	6 8
Average for the year		5 9	7 11	6 3

¹ Section 8 of the Corn Returns Act, 1882, as amended by Section (2) of the Corn Sales Act, 1921, provides that in the weekly summary of quantities and prices each sort of British corn shall be computed with reference to the hundredweight of one hundred and twelve imperial standard pounds.

level, it was, perhaps, better able to withstand it than the sorely-tried arable areas. Fruit as a whole sold at rather better figures, although several individual descriptions were cheaper on the year, while the vegetable index also was slightly higher.

Grain.

The average prices of *British Corn* during each week of 1931, together with the annual averages over the past ten years, are given in Tables VI and VII.

TABLE VII.—Annual Average Prices, per cwt. (of 112 Imperial Standard lb.), of British Wheat, Barley and Oats in England and Wales in each Year from 1921 to 1931, as ascertained under the Corn Returns Act, 1882, and the Corn Sales Act, 1921.

Year	Annual Average Price per cwt.		
	Wheat	Barley	Oats
	s. d.	s. d.	s. d.
1921	16 8	14 7	12 3
1922	11 2	11 2	10 5
1923	9 10	9 5	9 7
1924	11 6	13 1	9 9
1925	12 2	11 9	9 9
1926	12 5	10 4	9 0
1927	11 6	11 9	9 1
1928	10 0	11 0	10 5
1929	9 10	9 11	8 10
1930	8 0	7 11	6 2
1931	5 9	7 11	6 3

Commencing the year with a figure below any recorded during 1930, *Wheat* prices fell away until the end of February, when the average was 5s. 1d. per cwt. For some considerable time after that there was an upward movement, and by the middle of August prices had risen to about 6s. 6d. per cwt., but later the tendency was irregular, and the year closed with an average of 6s. 1d. per cwt.—or 1d. more than at the corresponding period of 1930. On average, wheat sold at 5s. 9d. per cwt., as compared with 8s. in 1930, and the index fell by 29 points to 24 per cent. below pre-war.

The trend of prices of *Barley* in 1931 was much the same as in the preceding year, except that the level was rather lower in January and higher in September; taking the year as a whole, the average showed no change at exactly the 1911-13 figure.

Oats were a trifle dearer at 12 per cent. below the base period.

Up to about the middle of May, prices were under those ruling during the corresponding weeks of 1930, but from then until early in August a higher level prevailed. This was followed by a further period of lower figures, but during the last two months values again rose above those of the previous year, and on the average of the year, oats realised 1*d.* more at 6*s.* 3*d.* per cwt.

Live Stock.

Statistics of the prices of fat and store stock during the year under review and in earlier years are given in Tables VIII and IX.

On average, values for *Fat Cattle* were 22 per cent. above those ruling in 1911-13, as compared with 33 per cent. in 1929 and 1930. Except during June, when a rise occurred, the movement of prices was not dissimilar from that usually recorded, but the general level was distinctly lower. Quotations were at their maximum in June, when 1st quality Shorthorns averaged 50*s.* 10*d.* per live cwt., whereas the highest point reached in 1930 was the 54*s.* 11*d.* in April. At the Christmas fat stock shows and sales, values were very disappointing to vendors, the index figure for December being only 10 per cent. above pre-war as against 20 per cent. in December 1930. Taking 1931 as a whole, fat cattle were roughly 5*s.* per live cwt. cheaper than in 1930.

The fall in *Fat Sheep* prices was more pronounced than with cattle, the annual index number being calculated at 33 per cent. above the level of the base years, as compared with 60 per cent. in 1930, i.e. a drop of 27 points, or about 17 per cent. The decline that set in during the closing months of 1930 continued unabated up to the following March. A rather better tendency became apparent in April, but thereafter, and for the remainder of the year, the downward movement re-asserted itself. Between August and December the index figure showed the very heavy fall of 32 points, the year closing with prices no more than 6 per cent. above pre-war.

During the period under review, quotations for *Bacon Pigs* suffered a very severe set-back, averaging only 7 per cent. above 1911-13 as compared with 53 per cent. in 1930, 60 per cent. in 1929, and 35 per cent. in 1928. The year opened with prices about 5*s.* per score lower than in January 1930, and with almost monotonous regularity each succeeding month witnessed further reductions. By August, values had fallen to below pre-war levels and continued to recede for the remaining four months. *Porkers* also realised poor prices, although they were not so badly affected as bacon pigs. On average, they sold at 23 per cent. more than in 1911-13 as compared with 65 per cent. in 1930. Here again, the last five months of the year were the

TABLE VIII.—Monthly average Prices of Certain Descriptions of Fat and Store Stock in England and Wales during the Year 1931.

Description	Quality	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Per cwt. live weight														
FAT CATTLE:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Shorthorns	1	48 6 48	2 48	1 48	8 48	10 50	10 50	10 48	5 45	4 44	5 43	5 44	6 47	6
	2	43 1 42	9 42	8 43	4 43	8 45	7 45	8 43	5 40	6 39	3 38	2 39	1 42	3
Herefords ¹	1	47 7 47	6 48	4 49	6 50	1 52	3 50	9 47	10 45	3 44	1 43	2 43	11 47	6
	2	43 1 42	11 43	11 45	1 45	1 47	4 46	6 43	9 41	1 40	4 39	5 39	6 43	2
Devons ¹	1	50 6 49	8 49	10 51	0 51	10 52	8 51	7 49	10 47	7 46	2 44	10 45	8 49	3
	2	46 0 45	4 45	6 46	8 46	8 48	2 47	4 45	6 43	0 41	8 40	9 41	5 44	10
Fat Cows.	1	38 9 36	0 35	8 35	8 35	8 37	2 36	9 35	2 33	2 32	4 31	4 31	6 34	9
	2	29 4 28	7 28	4 28	4 28	4 29	7 29	0 27	8 25	10 25	4 24	5 24	6 27	5
Per head														
MILKING COWS:		£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Shorthorns in Milk.	1	31 1 30	13 29	11 28	19 28	0 27	9 28	13 28	9 28	0 28	18 29	11 30	6 29	2
	2	24 12 24	6 23	7 22	18 22	9 22	2 23	2 22	17 22	4 22	14 23	6 24	1 23	3
Calvers	1	27 19 27	11 27	2 26	19 26	6 26	5 26	1 25	19 26	0 26	4 27	1 27	0 26	14
	2	23 14 23	6 22	10 22	4 22	1 22	5 22	1 22	0 21	11 21	18 22	7 22	13 22	7
Per lb.														
VEAL CALVES	1	d. 13½	d. 13½	d. 13½	d. 14½	d. 14½	d. 13½	d. 12½	d. 12½	d. 11½	d. 11½	d. 11½	d. 12½	
	2	11½	12	12	12½	12½	12½	11½	10½	10½	10½	9½	11½	
FAT SHEEP:														
Downs	1	18½	12½	12½	12½	12½	12	11½	11½	11	10½	10	10½	11½
	2	11½	11½	11	11½	10½	10½	10½	10	9½	9½	8½	8½	10½
Longwools	1	12	12	11½	11½	11½	11½	10½	10½	10	9½	9½	8½	10½
	2	10½	10½	10½	10½	10½	10½	9½	9½	9½	9	8½	8	9½
Crossbreds	1	18	12½	12½	12½	12½	11½	11½	11½	10½	10½	9½	9½	11½
	2	11½	11	10½	11	10½	10½	10	9½	9	8½	8½	8½	10
Per score lb. dead weight														
FAT PIGS:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Baconers	1	14 0 13	11 13	8 13	7 13	3 11	11 11	0 10	10 10	3 10	0 9	10 9	7 11	10
	2	12 9 12	9 12	5 12	4 12	0 10	9 11	9 9	9 9	3 9	0 8	10 8	8 10	8
Sows	3	10 1 9	7 9	4 9	2 8	11 8	8 8	2 7	11 7	7 7	7 7	3 6	11 8	5
Porkers	1	17 9 17	4 16	10 16	2 15	3 13	6 12	6 12	3 12	4 12	5 12	5 12	6 14	3
	2	16 3 16	0 15	6 14	10 13	11 12	3 11	4 11	1 11	1 11	2 11	1 11	3 13	0
Per head														
STORE PIGS:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
8-12 weeks old	1	41 1 40	9 38	2 34	11 33	6 30	1 26	10 27	1 26	8 25	11 24	2 22	11 31	0
	2	30 11 30	9 28	5 25	4 24	5 21	8 19	6 19	8 19	1 18	4 16	9 15	4 22	6
12-16 weeks old	1	59 1 59	0 55	9 52	2 49	3 45	1 41	1 41	1 41	0 40	10 39	1 37	1 46	8
	2	48 8 48	8 46	2 42	8 40	2 36	2 32	9 33	0 31	10 31	7 30	6 28	9 37	7

¹ The prices of Herefords and Devons are based on a comparatively small number of quotations.

TABLE IX.—Yearly Average Prices of Certain Descriptions of Fat and Store Stock in England and Wales during the Years 1922–31.

Description	Quality	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	
Per cwt. live weight												
FAT CATTLE:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
Shorthorns . . .	1	64	5 59	10 60	0 59	11 55	10 50	6 55	0 52	4 52	1 47	6
	2	56	6 53	0 53	3 52	2 48	4 43	8 47	9 45	10 45	6 42	3
Herefords ¹ . . .	1	64	1 59	11 59	8 60	5 55	2 50	6 54	5 52	6 52	3 47	6
	2	57	0 53	6 53	1 53	5 48	7 45	8 49	7 47	10 47	9 43	2
Devons ¹ . . .	1	63	3 53	7 53	4 53	10 55	8 52	9 56	8 56	4 55	8 49	3
	2	53	1 50	8 49	5 51	11 45	9 47	6 49	7 50	1 50	2 44	10
Fat Cows . . .	1	49	6 46	0 45	3 45	10 40	8 36	10 40	10 39	7 39	6 34	9
	2	42	1 39	0 38	1 38	2 33	0 29	5 33	0 31	8 31	6 27	5
Per head												
MILKING COWS:		£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	
Shorthorns in Milk .	1	39	3 36	6 36	9 34	9 31	19 29	1 30	8 30	10 30	4 29	2
	2	30	8 28	8 28	19 26	15 25	0 23	3 24	15 24	8 24	1 23	3
Calvers . . .	1	35	15 33	8 33	2 32	6 29	19 27	3 27	9 27	9 27	6 26	14
	2	28	12 26	5 27	7 25	14 24	1 22	12 23	4 22	16 23	0 22	7
Per lb.												
VEAL CALVES . . .	1	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	
	2	14½	13½	13½	13½	13½	13	13½	13½	13½	12½	11½
FAT SHEEP:		d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	
Downs . . .	1	18½	16½	16½	16½	14	13½	14½	14	14	11½	11½
	2	15½	14½	14½	14½	12½	11½	12½	12½	12½	10½	10½
Longwools . . .	1	16½	15½	15½	15½	13	12	13½	12½	12½	11½	11½
	2	14½	13½	13½	12½	11½	10½	12	11½	11½	9½	9½
Crossbreds . . .	1	17½	16½	16½	16½	13½	13½	14½	13½	13½	11½	11½
	2	15½	14½	14½	14½	11½	11½	12½	12	12½	10½	10½
Per score lb. dead weight												
FAT PIGS:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
Baconers . . .	1	20	0 17	6 15	0 17	10 19	6 15	10 14	11 17	3 16	6 11	10
	2	18	0 15	9 13	4 16	4 18	0 14	5 13	5 15	11 15	4 10	8
Porkers . . .	1	22	3 19	9 16	4 18	11 21	1 18	0 16	2 18	11 19	0 14	3
	2	20	4 18	1 14	9 17	5 19	6 16	5 14	8 17	6 17	6 13	0
Per head												
STORE PIGS:		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
8-12 weeks old . .	1	42	8 43	11 25	9 31	4 46	6 37	9 24	8 36	6 44	5 31	0
	2	32	4 33	2 18	7 23	1 36	11 28	3 17	10 23	1 34	6 22	6
12-16 " " . . .	1	68	1 68	5 45	4 52	1 68	4 57	4 43	7 54	9 63	2 46	8
	2	54	5 55	0 35	11 41	2 56	7 46	3 33	8 43	11 52	1 37	7

¹ The prices of Herefords and Devons are based on a comparatively small number of quotations.

worst, quotations being only from 2 to 5 per cent. above the base levels.

Veal Calves were from $\frac{3}{4}$ d. to 1d. per lb. cheaper on the year.

In January, quotations for *Dairy Cows* were on a rather higher level than at the corresponding period of 1930, and continued so until April and May, when they fell below, and remained so for the rest of the year. On average, 1st quality Shorthorns in milk realised £29 2s. per head, or £1 2s. less than in 1930, the reduction in the case of best calvers being 12s. per head. The annual index number came out at 26 per cent. above pre-war, as compared with 31 per cent. in the preceding twelve months.

Store Cattle were slightly cheaper at 27 per cent. above 1911-13, but *Store Sheep* averaged only 31 per cent. over the base period as against 56 per cent. in 1930.

From the comparatively high level of prices prevailing in 1930, values for *Store Pigs* showed a sharp decline, the index number falling by 62 points to 51 per cent. in excess of pre-war. Quotations at the commencement of the year were fairly well maintained, but a succession of reductions brought the averages in December to fully 15s. per head below those recorded a year earlier in the case of young stores and about 20s. in the case of older pigs. Taking the year as a whole, the fall in prices ranged from 12s. to 16s. 6d. per head.

Dairy and Poultry Produce.

Milk prices, as agreed by the Permanent Joint Milk Committee of producers and distributors, are set out in the following table, being arranged so as to show the monthly variations throughout the calendar year, instead of from October to September—the period governed by the agreements. It will be recalled that supplies of liquid milk became insufficient for requirements during the latter part of November, due, it was said, to the dissatisfaction felt by producers at receiving summer prices during the winter months, especially having regard to the advancing cost of artificial feeding stuffs. The position was considered at special meetings of the Milk Committee on November 25 and 27, with the result that it was agreed that an extra 4d. per gallon should be paid in December 1931 and January 1932.

The index figure for milk delivered under contract during 1931 was 47 per cent. in excess of 1911-13, as compared with 61 per cent. in 1930.

Following a decline of 24 points in the *Butter* prices index number between 1929 and 1930, a further fall of 17 points was recorded during the year under review. Prices were low throughout the entire twelve months, the annual average being calculated at 11 per cent. above the base level.

Prices per Gallon of Liquid Milk.

	1930			1931		
	Class 1	Class 2 (a)	Class 2 (b)	Class 1	Class 2 (a)	Class 2 (b)
	10 per cent. Variation	25 per cent. Variation	Monthly Variation	10 per cent. Variation	25 per cent. Variation	Monthly Variation
January . . .	d. 17	d. 17	d. 16	d. 17	d. 16	d. 17
February . . .	17	16	16	17	16	17
March . . .	16	16	15	16	16	15
April . . .	12	12	12	12	12	13
May . . .	12	12	11½	12	11	11
June . . .	12	12	11½	12	11	11
July . . .	12	12	12	12	11	12
August . . .	12	12	12	12	12	12
September . .	16	16	16	12	12	13
October . . .	16	16	15	12	12	12
November . . .	16	16	17	12	12	13
December . . .	17	17	17	17 ¹	16 ¹	17 ¹
Average . . . (nearest ½d.)	14½	14½	14¼	13½	13	13½

¹ Raised from prices originally agreed.

Cheese also was again cheaper, averaging 16 per cent. in excess of pre-war as compared with 30 per cent. in 1930 and 58 per cent. in 1929.

During the summer of 1931, *Eggs* were exceptionally cheap, the index number in June being no more than 2 per cent. over June 1911-13. Thereafter, in accordance with the customary seasonal rise in prices, a much higher level was reached and maintained for some few months. In December, however, the index slumped by 30 points to 7 per cent. below pre-war, this being the first occasion since 1913 when prices were under the base level. Over the year as a whole, eggs averaged 16 per cent. in excess of 1911-13 as against 36 per cent. in 1930.

The *Poultry* index was little changed at 44 per cent. above pre-war.

Other Commodities.

Probably no description of farm produce is subject to such wide fluctuation in price as *Potatoes*; the movement between 1930 and 1931 provides an excellent illustration of this. It will be recalled that the index figure was below pre-war for the first six months of 1930, but that the marketing of the first and

second earlies was accompanied by a much higher level of prices—a feature well sustained by the late varieties. From the 49 per cent. above 1911–13 recorded in December 1930, the index figure jumped to 71 per cent. in the following month and rose steadily until June, when potatoes were selling at double pre-war prices. A sharp reaction occurred in August, but subsequently it became apparent that in addition to the unusually small crop gathered, the keeping quality of the tubers was poor. Accordingly, prices began to rise again, and the year closed with the index figure at 159 per cent. above pre-war. On the average of the year, potatoes realised 88 per cent. more than in 1911–13, as compared with 4 per cent. less in 1930.

Hay averaged 14 per cent. under pre-war as against 18 per cent. above during 1930, while *Wool* at the country sales (Table X) was as much as 48 per cent. cheaper than in 1911–13, as compared with 18 per cent. cheaper at the preceding year's sales. *Hops* showed some recovery from the extremely low levels ruling in 1930, the index figure appreciating by 30 points; it was, nevertheless, still as much as 23 per cent. below pre-war.

TABLE X.—Average Prices per lb. of Hogg and Ewe Wool ruling at the Chief Country Wool Sales in England and Wales in each Year from 1926 to 1931.

Description	1926	1927	1928	1929	1930	1931
<i>Washed Wool.</i>						
Lincoln	d.	d.	d.	d.	d.	d.
Border Leicester	12	13 $\frac{7}{8}$	18 $\frac{1}{8}$	14 $\frac{1}{8}$	10 $\frac{1}{8}$	—
Kent	13 $\frac{3}{8}$	15 $\frac{1}{8}$	20 $\frac{3}{8}$	15 $\frac{3}{8}$	9 $\frac{1}{8}$	5 $\frac{7}{8}$
Southdown	13 $\frac{3}{8}$	15 $\frac{3}{8}$	20	—	9	5 $\frac{1}{8}$
Hampshire	18 $\frac{1}{8}$	20 $\frac{3}{8}$	27 $\frac{1}{8}$	22 $\frac{3}{8}$	13 $\frac{1}{8}$	9 $\frac{1}{8}$
Shropshire	18	20 $\frac{1}{8}$	24 $\frac{7}{8}$	18 $\frac{7}{8}$	13	10
Suffolk	16 $\frac{3}{8}$	18 $\frac{1}{8}$	25 $\frac{1}{8}$	18 $\frac{1}{8}$	12 $\frac{3}{8}$	8 $\frac{1}{8}$
Kerry Hill	16 $\frac{3}{8}$	19 $\frac{3}{8}$	25 $\frac{3}{8}$	18 $\frac{3}{8}$	12	8 $\frac{3}{8}$
Half-bred	15 $\frac{3}{8}$	17 $\frac{3}{8}$	24	17 $\frac{3}{8}$	11 $\frac{3}{8}$	7 $\frac{3}{8}$
Cheviot	15 $\frac{1}{8}$	16 $\frac{1}{8}$	22 $\frac{3}{8}$	16 $\frac{7}{8}$	10 $\frac{1}{8}$	6 $\frac{1}{8}$
Welsh	15 $\frac{3}{8}$	16	21 $\frac{3}{8}$	15 $\frac{7}{8}$	11	6 $\frac{1}{8}$
	11 $\frac{3}{8}$	13	17 $\frac{3}{8}$	14	9 $\frac{3}{8}$	5 $\frac{3}{8}$
<i>Unwashed Wool.</i>						
Border Leicester	11 $\frac{3}{8}$	13 $\frac{3}{8}$	18 $\frac{1}{8}$	13 $\frac{1}{8}$	8	5
Kent	11 $\frac{3}{8}$	13 $\frac{1}{8}$	18 $\frac{1}{8}$	13	7 $\frac{7}{8}$	4 $\frac{3}{8}$
Southdown	14	17 $\frac{3}{8}$	21 $\frac{1}{8}$	14 $\frac{3}{8}$	9	6 $\frac{3}{8}$
Hampshire	14 $\frac{1}{8}$	16 $\frac{1}{8}$	19 $\frac{3}{8}$	13 $\frac{1}{8}$	8 $\frac{3}{8}$	6 $\frac{3}{8}$
Shropshire	13	14 $\frac{1}{8}$	20 $\frac{3}{8}$	14 $\frac{1}{8}$	9 $\frac{1}{8}$	6 $\frac{3}{8}$
Suffolk	13 $\frac{3}{8}$	15 $\frac{3}{8}$	20 $\frac{1}{8}$	14 $\frac{1}{8}$	9 $\frac{1}{8}$	5 $\frac{3}{8}$
Kerry Hill	12 $\frac{3}{8}$	14 $\frac{3}{8}$	19 $\frac{3}{8}$	13 $\frac{3}{8}$	8 $\frac{3}{8}$	5 $\frac{3}{8}$
Half-bred	12	14 $\frac{1}{8}$	18 $\frac{1}{8}$	13 $\frac{3}{8}$	8 $\frac{3}{8}$	4 $\frac{3}{8}$
Cheviot	12 $\frac{3}{8}$	14 $\frac{3}{8}$	18 $\frac{1}{8}$	13 $\frac{3}{8}$	8 $\frac{3}{8}$	5 $\frac{3}{8}$
Welsh	9 $\frac{1}{8}$	11 $\frac{3}{8}$	14 $\frac{1}{8}$	11 $\frac{1}{8}$	7 $\frac{7}{8}$	3 $\frac{3}{8}$
Exmoor	12 $\frac{3}{8}$	14 $\frac{3}{8}$	18 $\frac{3}{8}$	13 $\frac{3}{8}$	8 $\frac{3}{8}$	5 $\frac{3}{8}$

The index for *Fruit* as a whole was 15 points higher on the year at 32 per cent. over 1911-13. Apples, black and red currants and plums were appreciably dearer, while pears made slightly higher prices. Values for cherries, raspberries and strawberries, however, were lower. As regards *Vegetables*, the index number for the group showed a rise of 2 points to 40 per cent. in excess of the base level.

Feeding Stuffs.

The continued decline in the prices of farm produce naturally affected the market for feeding stuffs, with the result that values were at a very low point throughout the greater part of the year under review (see Tables XI and XII). The general index number of 17 per cent. below 1911-13 showed a drop of 13 points from the 1930 figure and was 56 points less than that recorded for 1929. Prices of most descriptions recovered sharply in October and November, but this was due not so much to any appreciable improvement in trade or world prices, but to the effect the departure of this country from the Gold Standard had upon the relative values of imported materials, both raw and concentrated, and its reaction on prices of home produce.

Imported *Feeding Barley* over the year as a whole was 29 per cent. cheaper than pre-war as compared with 20 per cent. in 1930, while the index for imported *Oats* was one point lower at 12 per cent. under 1911-13.

Maize prices slumped from the 4 per cent. above pre-war recorded in 1930 to 30 per cent. below, while *Maize Meal* showed a fall of 28 points to 23 per cent. under the base level.

Both *Bran* and *Middlings* made slightly better prices on average, the index figure for the former advancing by 4 points to 8 per cent. above 1911-13 and for middlings by one point to 12 per cent. under pre-war. *Barley Meal* sold at 19 per cent. less than in the base period as against 15 per cent. less in the preceding year.

Of the oilcakes, the index for *Linseed Cake* declined by 22 points to 2 per cent. below pre-war, but the fall in *Cottonseed Cakes* was comparatively slight, viz:—by from 2 to 4 points.

Dried Ale Grains averaged 17 per cent. less than in 1911-13, as compared with 6 per cent. less in 1930.

Fertilisers. Fertilisers as a whole were slightly cheaper during the year under review than in 1930, the general index number being 5 points lower at 4 per cent. less than in 1911-13.

The index for *Nitrate of Soda* fell by 5 points to 15 per cent. below pre-war, while *Kainit* showed a loss of 2 points, and *Superphosphate* 5 points. The largest individual decrease occurred in the case of *Sulphate of Ammonia*, the index number for which was 10 points lower on the year at 47 per cent. under pre-war cost.

TABLE XI.—Percentage Increases or Decreases* in the Monthly Prices of Certain Descriptions of Feeding Stuffs during the Year 1931 as compared with the corresponding Months of 1911-13.

Description of Feeding Stuff	Month											
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Imported Barley . . .	-41*	-43*	-36*	-33*	-27*	-28*	-29*	-28*	-29*	-23*	-7*	-8*
Imported Oats . . .	-26*	-28*	-23*	-16*	-10*	-14*	-18*	-22*	-19*	-7*	11	10
Maize . . .	-33*	-33*	-21*	-18*	-25*	-33*	-34*	-38*	-41*	-34*	-19*	-27*
Milling Offals . . .	-4*	-9*	-2*	3	3	-7*	-5*	-8*	-10*	NH	9	3
Oilcakes . . .	-9*	-6*	NH	-2*	-4*	-7*	-9*	-15*	-16*	-6*	2	NH
Brewers' Grains . . .	-27*	-29*	-24*	-21*	-16*	-14*	-15*	-18*	-20*	-15*	NH	1
Maize and Barley Meal . . .	-25*	-28*	-22*	-16*	-16*	-22*	-24*	-27*	-29*	-24*	-9*	-14*

* Decrease.

TABLE XII.—Percentage Increases or Decreases* in the Yearly Prices of Certain Descriptions of Feeding Stuffs and Fertilisers in each Year from 1922 to 1931, as compared with the average of the Three Years 1911-13.

Description	Year										
	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	
Imported Feeding Barley	32	15	49	44	22	48	47	20	-20*	-29*	
Imported Oats	47	35	35	46	30	42	52	25	-11*	-12*	
Middlings	33	23	44	33	15	38	39	18	-13*	-12*	
Bran	49	35	57	54	29	59	63	43	4	8	
Malze Meal	36	45	58	58	27	27	55	45	5	-23*	
Barley Meal	41	24	52	48	26	46	45	26	-15*	-19*	
Linseed Cake	66	42	53	52	39	38	46	58	20	-2*	
Cotton Seed Cake (English)	53	37	56	51	19	28	53	40	-2*	-4*	
Cotton Seed Cake (Egyptian)	51	35	51	45	12	22	43	37	-9*	-13*	
Malze	48	52	67	67	28	35	67	56	4	-30*	
Dried Ale Grains	54	32	47	54	22	29	54	49	-6*	-17*	
General Index No.	46	36	54	52	25	39	54	39	-4*	-17*	
Nitrate of Soda (N. 15½ per cent.)	39	28	30	23	24	20	1	-7*	-10*	-15*	
Basic Slag (P.A. 14 per cent.)	95	40	12	16	40	46	19	19	22	24	
Superphosphate (S.F.A. 13½ per cent.)	57	30	28	23	15	12	3	14	18	13	
Sulphate of Ammonia (N. 20·6 per cent.)	9	2	-4*	-13*	-19*	-26*	-32*	-34*	-37*	-47*	
Kainit (14 per cent. potash)	7	-20*	-12*	2	12	12	20	22	23	21	
General Index No.	47	23	19	14	13	10	-2*	NH	1	-4*	

* Decrease.

VI.—IMPORTS.

Table XIII shows the quantities and declared values of the principal agricultural commodities imported into Great Britain and Northern Ireland in 1930 and 1931, together with the annual averages during the period 1925 to 1929.

Grain and Meal.

Imports of *Wheat* were exceptionally heavy at 5,969,000 tons, as compared with 5,239,000 tons in 1930 and 5,588,000

TABLE XIII.—Quantities and Declared Values of Imports of the principal Agricultural Commodities into Great Britain and Northern Ireland in 1930 and 1931, with the Average of the Imports for the Years 1925 to 1929.

Commodity	Quantities			Declared Values		
	Annual Average 1925-29	1930*	1931†	Annual Average 1925-29	1930*	1931†
	Tons	Tons	Tons	£	£	£
<i>Grain and Meal.</i>						
Wheat	5,188,900	5,288,737	5,968,724	62,842,600	48,064,168	30,845,157
Wheat-Meal and Flour	493,650	586,412	537,583	7,643,200	6,646,207	4,037,212
Barley	687,290	760,388	772,816	6,973,600	4,593,812	4,143,413
Oats	362,900	431,555	438,312	3,185,800	2,409,111	1,925,696
Oatmeal (including Groats and Rolled Oats)	34,460	29,792	44,070	749,000	614,821	761,252
Peas (not fresh) . .	76,010	68,007	85,346	1,661,200	1,039,786	1,144,141
Beans (other than Haricot)	45,750	31,541	46,007‡	628,800	634,503	502,702‡
Maize	1,692,220	1,708,233	2,663,759	14,076,000	9,934,857	9,922,416
Maize Meal and Flour	122,050	138,527	109,230	1,161,000	1,001,313	665,227
<i>Meat.</i>						
Beef (Fresh, Chilled and Frozen) . . .	638,080	580,032	599,803	31,229,250	30,068,004	25,501,231
Other Descriptions (including tinned and extracts)	55,310	59,863	57,314	5,300,400	5,388,809	4,813,811
Mutton and Lamb .	282,140	327,486	365,066	19,630,410	20,298,499	18,916,588
Pork (including Bacon and Hams)	516,600	553,483	647,490	52,617,340	50,335,659	40,180,654
Unenumerated (including Rabbits) .	15,640	33,203	39,332§	904,900	1,797,295	1,625,160§
Total Dead Meat (except Poultry and Game)	1,507,670	1,554,067	1,709,005	109,682,300	108,378,266	90,536,444
Butter	300,010	341,081	403,558	51,288,600	46,869,697	46,357,997
Cheese	150,610	155,616	144,283	14,403,400	12,602,974	9,069,599
Milk, condensed . .	124,770	130,103	139,942	5,001,200	4,315,011	4,336,835
Eggs in shell . . .	Gt. Hunds. 23,952,350	Gt. Hunds. 26,541,280	Gt. Hunds. 25,920,303	16,698,000	16,377,646	13,763,338

* Revised figures.

† Subject to revision.

‡ Including Haricot, the different kinds not being separately distinguished.

§ Including Veal and other descriptions of Pork (Hearts, Livers and Kidneys, &c.).

tons in 1929, the greater part of the increase being due to large arrivals in the months of September and October. Russia's contribution showed an increase of over half-a-million tons (55 per cent.) at 1,447,000 tons, while Canada sent 46,000 tons more than in the preceding year, consigning a total of 1,355,000 tons. Supplies from Australia and the Argentine also were larger than in 1930, but imports from the United States of America dropped by over 85 per cent. to 562,000 tons.

Rather less *Flour* was imported, the total of 538,000 tons showing a decline of 48,000 tons on the year. Australia and Argentina sent more, but receipts from Canada, France and the United States were smaller.

Imports of *Barley* were a little higher at 773,000 tons. Russia—the largest individual exporter—consigned a slightly smaller amount, while arrivals from the United States and Roumania also showed a falling off. Canada, however, contributed 51,000 tons, or three times as much as in 1930.

Arrivals of *Oats* declined by 9 per cent. to 438,000 tons, but were still well above average. Germany consigned a mere 1,000 tons as compared with 153,000 tons in 1930, but supplies from the Argentine rose by 71,000 tons to 183,000 tons and those from Canada by 55,000 tons to 65,000 tons.

Maize was imported on quite a phenomenal scale, the total of 2,664,000 tons representing an additional 956,000 tons, or over 50 per cent. as compared with 1930. The Argentine more than doubled her 1930 contribution by sending 2,412,000 tons, but receipts from Roumania declined by 195,000 tons to no more than 29,000 tons, while South Africa contributed only 89,000 tons as against 264,000 tons in 1930.

Meat.

Imports of *Beef* were somewhat larger on the year at 600,000 tons, the chilled variety accounting for an extra 11,000 tons and frozen 10,000 tons. Arrivals of chilled beef from Argentina rose to 396,000 tons, while Brazil sent 30,000 tons as against 25,000 tons in 1930, but receipts from Uruguay were less. Of the frozen beef, 17,000 tons more came from Australia while there was a lesser increase in supplies from New Zealand. Most other sources, however, consigned less.

Receipts of frozen *Mutton and Lamb* rose by 11 per cent. to 356,000 tons. New Zealand—the principal source of supply—contributed 173,000 tons as compared with 165,000 tons in 1930, and Australia 77,000 tons as against 41,000 tons. Arrivals from the Argentine were slightly larger on the year.

Supplies of *Bacon* were again heavier, totalling 557,000 tons as against 460,000 tons in 1930, an increase of about 20 per cent. Denmark was responsible for shipping an extra 61,000 tons at

367,000 tons, while Holland and Sweden also sent more. Declines occurred, however, in arrivals from Canada, the United States and the Irish Free State. Imports of *Hams* were again slightly lower at 42,000 tons, but receipts of *Fresh Pork* from the Irish Free State rose by 5,000 tons to 19,000 tons.

Dairy Produce.

Most of the important *Butter* exporting countries consigned heavier supplies to us than in 1930, and the total of 404,000 tons represents an advance of 63,000 tons (18 per cent.) on the year. Australia and New Zealand between them contributed almost 50,000 tons more, while smaller increases occurred in supplies from Denmark and Finland. Imports from Russia, however, rose by 12,000 tons to 20,000 tons.

Arrivals of *Cheese* were the lowest recorded since 1923, totalling 144,000 tons, but more *Condensed Milk* was received.

The total imports of *Eggs* in 1931 showed little alteration on the year, being actually about 2 per cent. less at 25,920,000 great hundreds. Changes among the individual sources of supply, however, were numerous. Australia, South Africa, Denmark, Holland and Russia sent more, but the Irish Free State, Belgium, China, France, Egypt, Poland and Sweden less. Comparisons of the actual contributions from the principal exporting countries are as follows—Denmark, 7,548,245 as against 6,278,383, in terms of great hundreds in 1930; the Irish Free State 4,575,107 as against 4,781,096; Holland 3,835,698 as against 3,680,696; Poland 2,687,069 as against 3,612,564; and Belgium 2,072,937 as against 2,333,656.

Miscellaneous Agricultural Produce.

Arrivals of *Potatoes* totalled 829,000 tons, representing a remarkable increase of 540,000 tons on 1930, and of half-a-million tons on the average of the previous five years. While somewhat heavier supplies were received during the earlier part of the year, the bulk of the increase occurred in the last four months, when imports totalled 352,000 tons as compared with an average of only 31,000 tons for that period of the year. Germany sent 230,000 tons during 1931 as against 13,000 tons in 1930, and Holland 175,000 tons as against 46,000 tons. Receipts from France and the Channel Islands, however, were on a rather smaller scale.

Total Imports.

During 1931, approximately £240 million was spent on the importation of the principal agricultural products into Great Britain and Northern Ireland, of which £50½ million represented payment for grain and meal, £109 million for meat (including

£16 million for live animals for food), £69 million for dairy and poultry produce, £7 million for potatoes and £4½ million for tomatoes. Of the total sum involved, about £138 million (58 per cent.) was paid in respect of foreign produce, £63 million (26 per cent.) for that from our Overseas Dominions and £22 million (9 per cent.) for Irish Free State produce. The remaining £17 million (7 per cent.) represents the value of imports from countries not separately distinguished in the Trade Returns.

R. E. STANLEY.

52 Culmstock Road,
Clapham Common,
S.W.11.

ALDERMAN GEORGE GREY REA, C.B.E.

By the death of Alderman Rea the Society has lost one of its oldest and most faithful supporters and the North of England one of its most prominent and useful public citizens.

Alderman Rea was born in 1858, the son of Mr. George Rea, a large farmer in North Northumberland. He himself farmed for many years the extensive holding of North Middleton, near Wooler, and when that was sold, some twelve years ago, he purchased from the Earl of Tankerville the farm of South Doddington in the same neighbourhood, where he lived until his death. In addition to his own farming undertakings he held the agency of Pallinsburn estate as well as one or two others of smaller extent.

Mr. Rea became a member of the Northumberland County Council about thirty years ago and was elected an Alderman of that body in 1916. He took a most active part in the business of the Council, served upon a great number of its Committees and was Chairman of the Agricultural Committee from its formation in 1920 until his death. For the last few years he was Chairman of the Agricultural Education Committee also. He took a deep interest in the work of the Council's experimental farm at Cackle Park and was for many years a member of the Management Committee; he also represented the County Council on the Agricultural Committee of Armstrong College.

Alderman Rea was a member of the Central Chamber of Agriculture, and was a trusted and influential member of the Northumberland Branch of the Central Landowners' Association and of the Berwick-on-Tweed Branch of the National Farmers' Union. The catalogue of his public services could be made much longer; it was indeed a matter for wonder that any man could do so much and so well.

Mr. Rea represented Northumberland on the Council of this Society from 1905 onwards and was a member of many of its Committees. He gave especially useful service on the Stock Prizes Committee, where his intimate knowledge of North Country stock and stockmen was invaluable. His local knowledge was also of great service in connection with the Shows at Newcastle-on-Tyne in 1908 and 1923 and at Darlington in 1920.

He combined great personal charm with a high measure of ability and a remarkable endowment of shrewd North Country common sense. The Society is much the poorer for his death.

C. H. S.

BOOKS OF THE YEAR.

ANY year's output of agricultural literature amounts nowadays to a good many scores of volumes, and it is only possible, in a brief review such as this must necessarily be, to mention a few of the more noteworthy.

On the more purely scientific side perhaps the most important book of the year is Dr. B. A. Keen's *The Physical Properties of the Soil* (London, 1931). Of this it need only be said that it is a full and up-to-date exposition of what has now become a large and difficult subject and on which the author (who is Assistant Director of Rothamsted) is an acknowledged authority.

A very useful addition to the list of reference works is *Baillière's Encyclopædia of Scientific Agriculture*, edited by Dr. Herbert Hunter of Cambridge (2 volumes, 1931). This is not, and indeed does not profess to be, a complete encyclopædia of agricultural science and farming practice. It represents, in the main, an attempt to summarise recent progress on the scientific side and thus to supplement, rather than to replace, the more elaborate and larger reference books already in existence—which are all, in certain respects, seriously out of date. The Editor has necessarily had a most difficult task, especially in deciding what to leave out, and not every reader will find in the book all that he could wish. Among the subjects which receive very adequate treatment are soil science, plant nutrition and manuring, plant breeding, plant diseases and market gardening. There are also numbers of useful articles on marketing and other economic topics. On the livestock side the subject of nutrition receives a very fair quota of space and there is a long article on the poultry industry, but, on the other hand, there is very little on the subject of animal breeding or dairying, and the whole subject of animal diseases has been excluded. Within the limits indicated the book is very good.

Professor James Ritchie's *Beasts and Birds as Farm Pests* (Edinburgh, 1931) may be heartily recommended as a farmer's book and will appeal to anybody with an interest in the wild life of the countryside. It deals with those mammals, from mice to foxes and deer, and with those birds from the sparrow to the eagle which are, or may be at times, harmful to agriculture. Professor Ritchie is, of course, a naturalist of the first rank, and he almost vies with his predecessor, Professor J. Arthur Thomson, in the popular exposition of his subject. Some of the questions touched upon are necessarily controversial, but the author is eminently fair in his judgments, whether he is balancing the sins against the good works of the weasel or the rook, or whether he is weighing the point of view of the sportsman or the bird-lover against that of the man who has to find his living from the land. Practical measures against the more important pests are given in adequate detail. The book, besides being eminently readable, is well illustrated and attractively printed.

Among serious contributions to agricultural economics Dr. K. A. H. Murray's *Factors affecting the Prices of Livestock in Great Britain* (Oxford, 1931) deserves special mention. This book does not make easy reading, for the causes of price changes are complex and elusive, and any real attempt to disentangle them must necessarily involve the collection, tabulation and mathematical treatment of an enormous mass of figures. This arduous labour the author has carried through with thoroughness and skill. He does not indeed profess to have completed the task, and points out many directions in which further research is required. But he foresees the possibility of carrying the work to a point when reasonably accurate prediction of price movements will become possible. A few of the conclusions may be quoted by way of illustrating their nature:—

"The premiums between first and second quality beef tend to increase during periods of falling prices and to decrease during periods of rising prices."

"Industrial depression and abnormal unemployment of labour weaken the potential demand for beef."

"There was practically no association between imports of mutton and lamb and the purchasing power of prime (English) mutton."

"Changes in the demand factor are not so important in determining the price of higher quality mutton and lamb as in the determination of the price of poorer qualities, indicating a relatively stable demand for the better grades."

"Cyclical fluctuations in the purchasing power of pigs, pork and bacon are more pronounced and regular than in the price movements of any other type of livestock in this country. In the post-war period the cycle of prices has averaged 41 months and has ranged from three to four years."

Among these and the other conclusions there are some that merely state, in precise form, facts that are fairly generally under-

stood. Other points that Dr. Murray has established have not been appreciated in the past, and others again are actually surprising. Nobody who handles any considerable numbers of livestock can afford to neglect the book.

Among publications on practical farming subjects the new series of *Bulletins* published by the Ministry of Agriculture take a high place. Some thirty of these have appeared in the past year and they mark a great improvement on the old leaflets, containing, as a rule, all that the farmer can usefully know about their respective subjects. Among those which the reviewer has read, No. 26, on Johnes Disease; No. 27, on Agricultural Machinery in Canada and the United States; No. 28, on Artificial Fertilisers; No. 32, on Pig Keeping; and No. 37, on Ensilage, seemed to be especially valuable; but every farmer will find others that bear upon his special interests.

A little book that lives up to the motto of this Society is *Sheep Folding Practice* (London, 1931), by Mr. J. F. H. Thomas, the Vice-Principal of the Royal Agricultural College. Arable sheep farming has, of course, suffered a very severe decline in recent years; but, as Mr. Troup shows elsewhere in this *Journal*, a really satisfactory alternative method of farming the poorer chalk and limestone soils is yet to be found. Mr. Thomas shows an intimate knowledge of the practical side of arable sheep and shepherding and has obviously read and pondered all the available data on sheep nutrition and other scientific aspects of his subject. The book should appeal to everyone from the novice to the expert.

A notable addition to the scanty lighter literature of farming is *Farmer's Glory*, by Mr. A. G. Street (London, 1931). This is a plain story of the author's own life, which in itself has not been a specially remarkable one—an upbringing on a big Wiltshire arable farm; an apprenticeship under his own father; an interlude of pioneer prairie farming in Canada; wartime farming again in Wiltshire; and, finally, the bitter struggle (which has, however, left remarkably little bitterness in the author's mind) on the old family place in the post-war years. The writer pretends to no special eminence or success in farming; indeed, he would seem to have been rather too ready to shift from one expedient to another without giving anything quite a fair chance. The story is a great one, not because it is extraordinary, but rather because it is typical and because it is so admirably told—in a quiet yet vivid way and with many touches of real humour. It will long remain a valuable record of the times.

Finally, there must be mentioned Sir John Russell's Presidential Address to Section M (Agriculture) of the British Association, delivered at the Centenary Meeting in London under the title *The Changing Outlook in Agriculture*. Sir John began with

a wide survey of agricultural progress during the past hundred years, both in Britain and in the Empire overseas; this portion of his Address will hardly bear condensation. His conclusion, in which he looked to the future, may best be quoted in full.

"Our greatest need, however, is a better organisation of agricultural production. A beginning has been made by the overseas farmers; the necessity for sending all produce through one or two ports has compelled them to work through large organisations for grading, transporting and selling the produce, with skilled representatives in this country. Dealing in hundreds or thousands of tons they reduce all costs and all wastage to a minimum. Gradually the British farmer is organising; the difficulty is to do this without destroying his sturdy individuality, one of his greatest assets, the loss of which would irretrievably damage our country life.

"But greater organisation is possible and is highly desirable.

"At present British farmers, Empire farmers, and farmers from all over the world indulge in deadly competition in the British market. In the end they obtain wholly inadequate prices. But the community as a whole does not gain because they lose. The final cost of food to the consumer is profoundly affected by costs of handling, transport, preparation and distribution, all expensive services. Better organisation of production, while benefiting the countryman, would not injure the rest of the community.

"Thanks to the inquiries made by the Ministry of Agriculture and the Empire Marketing Board, the food requirements of this country are pretty well known. Our next great step forward will be to organise production on a contract basis so as to satisfy these requirements with a reasonable margin of safety, but without the terrible waste involved in those large excesses which injure the grower without benefiting the consumer.

"Something of the sort is essential if farming is to survive as an occupation for the best of our people, offering a reasonable standard of living to farmer and worker. The advantages would be incalculable. Organised production and the development of the contract system, which has done so much for milk producers, would permit of a renewal and development of country life to the fullest extent now made possible by scientific and technical advances. By common consent many of the ills of to-day arise from the fact that for nearly a century the industrial side of our national life has been fostered at the expense of the rural side, producing an over-industrialised town population peculiarly susceptible to world economic disturbances, and now largely without employment or prospect of employment. The rural population, on the other hand, is far less sensitive to economic disturbances; the low rate of unemployment in the countryside shows the greater independence and resilience of the conditions of country life, and points clearly to the fact that improvements in our rural life would benefit not only the countryman, but the whole community."

THE WARWICK SHOW, 1931.

THE Show at Warwick—the ninetieth of the series—was really held to celebrate the centenary of the Warwickshire Agricultural Society.

Some few years ago the Warwickshire Society approached

the Royal Agricultural Society of England and inquired if arrangements could be made for a visit of the "Royal" to Warwick in 1931 in celebration of this event. The Council felt that the request was a somewhat unusual one, for on such an important occasion it is usual for the organisation itself on attaining its hundredth birthday, to make a special effort and arrange additional features and attractions at the Show in order to mark the event and record the same in the annals of the Society.

It was recognised that the invitation was a most generous one, and that the National Society should accept it and do everything possible to render the event an outstanding success.

In due course the Town of Warwick endorsed the invitation of the County Agricultural Society and Lady Warwick and the Warwick Estate Trustees very generously placed the Castle Park at the disposal of the Society as a Showyard. It is interesting to record that this is the second occasion upon which the Park has been used for the Royal Show, and in spite of the growth of the Show in all departments the same area sufficed for the 1931 Show as was utilised on the previous visit in 1892.

The Show could not have been staged in more picturesque surroundings, and the general lay-out, with the smooth-running River Avon as a boundary and the ancient Castle in the background, elicited praise not only from thousands of British visitors, but from the large contingent of overseas agriculturists who made a visit to the Royal Show part of their programme of things to be seen in the Old Country.

Five of the Royal Agricultural Society's annual shows have now taken place in Warwickshire—two at Birmingham, in 1876 and 1898, and three at Warwick. Some details of the last-mentioned are given below.

Year	President	No. of Imple- ment, &c., Stands	Entries of Live Stock	No. of Persons admitted	Result + = Surplus
1859	7th Duke of Marlborough .	245	1,159	55,577	£ + 1,433
1892	1st Earl of Feversham .	411	1,864	96,462	+ 2,053
1931	Sir Arthur Hazlerigg, Bt. .	388	3,061	72,259	- 3,297

A tabular statement comparing the entries for the 1931 Show with those of the previous seven and the Warwick Show of 1892 will be found on the next page.

STATEMENT OF ENTRIES FOR THE 1931 SHOW, COMPARED WITH PREVIOUS YEARS.

Entries of Live Stock, Poultry and Produce.

	Warwick, 1931	Man- chester, 1930	Harro- gate, 1929	Notting- ham, 1928	Newport, 1927	Reading, 1926	Chester, 1925	Leicester, 1924	Warwick, 1892
Horses . . .	568 ¹	512 ¹	634 ¹	607 ¹	429 ¹	614 ¹	658 ¹	768 ¹	447
Cattle . . .	1,168 ¹	1,164 ¹	1,263 ¹	1,261 ¹	1,214 ¹	1,640 ¹	1,585 ¹	1,302 ¹	605
Goats . . .	68 ¹	48 ¹	92 ¹	61 ¹	40 ¹	67 ¹	56 ¹	60 ¹	14
Sheep . . .	569	735	723	591	524	724	711	633	596
Pigs . . .	688	678	691	833	664	986	932	1,212	202
Total . . .	3,061	3,137	3,403	3,353	2,871	4,031	3,922	3,975	1,864
Poultry . . .	741	901	943	1,036	887	1,111	970	1,157	836
Produce . . .	253	506	363	365	350	356	612	300	423

¹ Exclusive of Double Entries.

Shedding in Implement Yard (in Feet).

Description of Shedding	Warwick, 1931	Man- chester, 1930	Harro- gate, 1929	Notting- ham, 1928	Newport, 1927	Reading, 1926	Chester, 1925	Leicester, 1924	Warwick, 1892
Ordinary . .	Feet 2,190	Feet 2,690	Feet 2,995	Feet 3,035	Feet 2,375	Feet 3,360	Feet 3,985	Feet 4,145	Feet 8,241
Machinery . .	3,690	4,515	4,170	5,466	3,555	4,090	3,380	3,635	2,151
Special . . . (Seeds, Fertilisers &c.)	3,053	3,488	3,686	3,501	2,756	3,420	3,575	3,867	2,119
Total . . . (Exclusive of Open Ground Space.)	8,963	10,693	10,851	12,002	9,486	10,870	10,940	11,697	12,511
No. of Stands .	388	443	431	467	369	446	433	455	411

On another page is printed a comparative statement of classes, prizes, and entries at the two shows of 1892 and 1931.

Breed Societies contributed £3,533 and the Warwick Local Committee £1,373 towards the £15,213, which was the total value of the prizes offered for competition.

By the introduction of a new type of double-row shedding for the housing of the exhibits of cattle a saving was effected in cost of erection, and this saving was passed on to exhibitors in the form of reduced entry fees.

Owing to their entries not reaching the minimum number specified in the regulations, the classification was cancelled for Shetland ponies, South Devon and Park Cattle, Dorset Down and Leicester sheep, and Cumberland pigs.

For the first time provision was on this occasion made for

**COMPARATIVE STATEMENT OF ENTRIES, &c.,
AT TWO SHOWS HELD AT WARWICK IN 1892 AND 1931.**

HORSES, CATTLE AND GOATS	1892		1931		SHEEP, PIGS, POULTRY AND PRODUCE	1892		1931	
	Classes.	Entries.	Classes.	Entries.		Classes.	Entries.	Classes.	Entries.
HORSES:—					SHEEP:—				
Prizes		£1,265		£3,382	Prizes		£900		£2,071
Shires	7	128	10	83	Oxford Down	4	56	5	38
Clydesdales	5	30	5	27	Shropshire	6	238	6	46
Suffolks	5	31	12	79	Southdown	4	102	6	66
Percherons	—	—	8	45	Hampshire Down	4	51	5	44
Hunters—					Suffolk	4	23	6	57
Breeding Classes	8	125	10	114	Dorset Down	—	—	3	—
Riding Classes	—	—	7	131	Dorset Horn	—	—	3	13
Polo and Riding					Wiltshire or Western				
Ponies—					Horn	—	—	3	18
Breeding Classes	—	—	5	40	Ryeland	—	—	5	22
Hack and Riding					Kerry Hill (Wales)	—	—	5	51
Ponies	—	—	3	36	Clun Forest	2	—	2	16
Coach Horses	2	10	—	—	Lincoln	4	36	5	25
Hackneys	6	48	—	—	Leicester	4	35	4	—
Ponies	4	46	—	—	Border Leicester	3	21	4	25
Welsh Ponies	—	—	2	14	Wensleydale	—	—	5	25
Shetland Ponies	—	—	2	—	Kent or Romney				
Children's Ponies	—	—	3	32	Marsh	—	—	6	40
Driving Classes	2	18	10	72	Cotswold	4	28	—	—
Agricultural	2	7	—	—	South Devon	—	—	3	15
Jumping	—	—	5	223	Dartmoor	—	—	2	8
Total for HORSES	41	440	82	895 ¹	Cheviot	—	—	3	12
CATTLE:—					Welsh Mountain	2	10	5	35
Prizes		£1,361		£6,518	Black Welsh Moun-			2	13
Shorthorn	7	136	11	103	tain	—	—		
Hereford	7	53	9	46	Total for SHEEP	41	600	88	569
Devon	6	22	5	29					
Sussex	6	29	5	26	PIGS:—				
Welsh	5	28	5	24	Prizes		£432		£1,711
Longhorn	2	7	4	29	Large White	4	32	8	109
Aberdeen-Angus	—	—	6	66	Middle White	4	14	8	124
Belted Galloway	—	—	5	36	Small White	4	12	—	—
Galloway	—	—	4	17	Tamworth	4	46	6	48
Park Cattle	—	—	2	—	Berkshire	4	85	8	72
Dairy Shorthorn	—	—	10	175	Wessex Saddleback	—	—	6	50
Lincolnshire Red					Large Black	4	13	8	86
Shorthorn	—	—	7	42	Gloucestershire Old				
South Devon	—	—	4	—	Spots	—	—	6	40
Red Poll	6	37	8	113	Cumberland	—	—	6	—
Blue Albion	—	—	6	35	Essex	—	—	6	31
British Friesian	—	—	12	127	Long White Lop-				
Ayrshire	—	—	6	58	Eared	—	—	6	38
Guernsey	5	45	7	67	Total for PIGS	24	202	68	688
Jersey	6	178	7	105					
Kerry	2	24	5	30	POULTRY:—				
Dexter	2	32	5	40	Prizes		£272		£508
Milk Yield	2	16	11	113	Entries	98	886	109	741
Butter Test	—	—	2	71					
Total for CATTLE	56	607	146	1,352 ¹	PRODUCE:—				
GOATS:—					Prizes		£236		£314
Prizes		£35		£110	Entries	32	433	40	253
Inspection Classes	5	14	9	68					
Milk Yield	—	—	2	50					
Total for GOATS	5	14	11	118 ¹					

Grand Totals for LIVE STOCK, } 544 Classes . 4,616 Entries . £15,213² Prizes
POULTRY, PRODUCE, &c., in 1931 }

¹ Animals exhibited in more than one class are here counted as separate entries.

² Including £520 for Flower Show and £78 for Butter-making Competitions.

³ Classes cancelled under regulation of Prize Sheet.

the segregation at the Show in separate shedding of exhibits of cattle coming from herds licensed for the production of Certified and Grade A (Tuberculin-tested) milk, in accordance with the regulations laid down by the Ministry of Health. Sixty-nine entries were made by the owners of twenty-six licensed herds.

Much anxiety was caused to the Show officials by the Foot and Mouth Disease "stand-still" Order which the Ministry of Agriculture found it necessary to put into force on June 19: for if this Order had not been modified, as it was, early in July, the Royal Show at Warwick—like the Centenary Show of the Highland Society at Edinburgh—would have had no cloven-hoofed animals on exhibition.

Even so, numbers of entries made by stock-owners in the Northern counties of England and the North of Scotland could not be sent to Warwick. Nevertheless, most of the more important breeds had a creditable representation in the show-yard. Among the breeds most affected by the Ministry's restrictions were Galloway cattle, of which not one exhibit was present, and Wensleydale sheep, of which there was but one exhibitor.

(A separate descriptive Report on the Live Stock at Warwick Show is contained in later pages, and the Judges' Awards will be found in the Appendix.)

Having secured an exhibit of live stock at Warwick, the Society's troubles were by no means at an end, for on the afternoon of the opening day a notification was received from the Ministry to the effect that Foot and Mouth Disease had been confirmed in Buckinghamshire, at West Wycombe, and that any cattle, goats, sheep or pigs which had come from anywhere within a 15-miles radius of the infected place would have to be removed from the Show and placed in isolation. Some 100 animals were involved, including some cattle from the Royal Farms at Windsor, and arrangements were immediately made for emergency shedding to be built outside the actual show area.

This shedding was finished during the night of July 7-8, and by the morning all the animals concerned were transferred with their attendants to the isolation quarters, where they remained until July 20.

The arrangements for the segregation of the animals were inspected by the Chief Veterinary Officers of the Ministry on Wednesday, July 8, and by the Minister (the Right Hon. Dr. C. Addison) and the Permanent Secretary of the Department on July 9, all of whom expressed their great satisfaction at the expeditious and thorough way in which the isolation had been carried out.

Rumours were current on the Wednesday that Foot and Mouth Disease had actually broken out amongst the cattle in the showyard. Luckily for everyone concerned, these rumours

had not the slightest foundation, and all exhibits, except those in quarantine, were permitted to be moved to their destinations at the end of the Show by licence from the Ministry.

The marquees devoted to the Horticultural section were, as on former occasions, visited by a large percentage of the Show visitors each day, and the exhibits in the several classes, which again reached a high level of excellence, provided once more the most attractive of the many "side-shows" at the "Royal."

In the special pavilion of the Ministry of Agriculture the National Mark scheme as applied to Cheese and Honey formed a special feature. Grading and packing of various other commodities to which the National Mark had been applied were also demonstrated.

Although rain had fallen during the week-end and on the Monday preceding the opening, practically the whole of the Show period was favoured with fine, sunny weather.

At former shows judging in the breeding classes of stock has begun at 9 a.m. At Warwick, however, except in a few of the larger sections (Dairy Shorthorns, British Friesians, Large White, Middle White and Large Black pigs), judging did not begin until 10 a.m.

Among the visitors from overseas on the opening day were a party of farmers from South Africa, who during the summer made an extensive tour of the country under the auspices of the British National Union. The party were also present at the Show on the two following days.

On the Wednesday the Prince of Wales favoured the Show with his presence. His Royal Highness journeyed by air from Sunningdale, and landed, shortly after 11.30 a.m., on the race-course at Warwick, where he was met by the Mayor, the Countess of Warwick. Accompanied by Lady Warwick, the Royal visitor drove through the town to the Show entrance, at which place he was met by the Honorary Director, Mr. Roland Burke, and conducted to the Royal Pavilion. Here the Prince was received by Sir Arthur Hazlerigg, President of the Society. Among those presented to His Royal Highness was Councillor Hoare, the Mayor of Derby, where the Royal Show will be held in 1933.

In front of the Royal Pavilion two Italian representatives presented the Prince of Wales with an alabaster plaque with a suitably-inscribed silver panel commemorating the exhibition by His Royal Highness of a Devon Bull in the British live stock section of the Milan Fair.

His Royal Highness began his tour of the exhibition soon after his arrival by visiting the Flower Show, the Forestry exhibition, and the Working Dairy. The Prince honoured the President with his presence at luncheon in the pavilion. During

the afternoon His Royal Highness inspected the joint exhibit of the Warwickshire Education Committee and Harper Adams Agricultural College, and later from the Royal box in the Grand Stand witnessed the parade of cattle, and the Military Display by the Royal Scots Greys in the Large Ring. Having then inspected the exhibits on a number of stands in the Implement and Machinery section, the Prince of Wales left the Show at 4.45 p.m. for the Castle prior to proceeding by aeroplane back to Sunningdale.

On Wednesday, under the auspices of the National Association of Young Farmers Clubs, the 10th annual international dairy cattle judging competition was decided in the showyard. Teams representing the United States of America, Northern Ireland and England and Wales competed. The championship was won by the American visitors.

On Thursday the General Meeting of Governors and Members was held in the Large Tent, when cordial resolutions were passed gratefully acknowledging all that the Mayor and Corporation and the Local Committee had done for the success of the Show.

As in past years, special arrangements were made on the Saturday for the visit to the Show of school children from the locality in organised parties under the supervision of their teachers. Large numbers took advantage of the facilities afforded.

Noticeable among the visitors on Saturday were His Majesty the King's Indian Orderly Officers.

A Hives and Honey section, arranged by the British Bee-Keepers' Association, attracted much attention.

In the showyard forge shoeing smiths competed daily for prizes offered by the National Master Farriers and Blacksmiths Association and the Gold Medal of the Worshipful Company of Farriers.

Musical Rides and Vaulting Displays were given by a detachment of the Royal Scots Greys each afternoon after the judging day. Programmes of music were provided by the Band of that Regiment.

In the tables below will be found details of the admissions at Warwick, with corresponding figures for the six preceding shows and that at Warwick in 1892. The aggregate for the five days was 72,259, the biggest daily attendance being on the Thursday.

A slight change was made at Warwick by reducing the price of admission on the Friday from 3s. to 2s. 6d. Children were also admitted throughout the Show at half-price.

The car parking arrangements were taken charge of by Mr. W. Fitt, the Road Manager of the Royal Automobile Club, and were the subject of very favourable comment by all users

Admissions by Payment at Warwick, 1931.

Day of Show	11 a.m.	1 p.m.	3 p.m.	5 p.m.	Day's total
Tuesday (10s.) . .	678	1,475	1,721	1,869	1,887
Wednesday (5s.) . .	3,009	7,785	10,256	11,164	11,273
Thursday (3s.) . .	6,784	15,722	21,560	23,973	24,198
Friday (2s. 6d.) . .	4,043	9,171	13,290	14,940	15,193
Saturday (1s.) . .	4,426	7,939	15,233	19,347	19,708
Total for Show					72,259

Total Daily Admissions at the 1931 Show, compared with the previous six Shows and the Warwick Show, 1892.

Day of Show	Warwick, 1931	Manchester, 1930	Harrogate, 1929	Nottingham, 1928	Newport, 1927	Reading, 1926	Chester, 1925	Warwick, 1892
First	1,887	2,483	3,884	2,388	1,214	3,568	3,352	3,836 ¹
Second. . . .	11,273	14,352	23,598	18,244	7,515	13,777	27,215	16,598
Third	24,198	31,115	51,252	44,293	19,456	19,869	43,981	15,779
Fourth. . . .	15,193	14,943	18,924	14,775	10,528	11,902	20,682	86,448
Fifth	19,708	38,023	26,359	28,977	28,964	24,744	17,650	28,801
	72,259	100,918	124,017	108,677	62,367	73,860	112,880	96,462

¹ Including 286 on previous Saturday, when the Implement Department was open.

of road vehicles. Almost a record number of cars was dealt with, but so well organised were the road routes to the Show and so well posted and staffed by Road Guides that no congestion occurred, nor was there any delay in arrival or departure. It is indeed a great loss to the Society and the Show that owing to the death of Mr. Fitt they will no longer have the benefit of his services and his wonderful genius for organising road traffic and car parking.

The Great Western Railway constructed a new Goods Station at Cape Yard and spent about £8,500 in sidings and docks for the handling of the whole of the rail traffic. They employed a staff of over 100 trained men to deal with the loading and unloading and in no single instance was there any delay, every train inwards and outwards arriving either before or at its scheduled time.

Postal and telegraphic arrangements were excellent. As a matter of history I must not omit to mention that the "Teleprinter" was used for the first time for the transmission of the Press and other publicity matter from the Show.

Again, for the fourth time, the Y.M.C.A. undertook "wel-

fare" work for the grooms, stockmen, &c., at the Show and organised sports, football matches and concerts each evening.

As is usual, but especially fitting upon this occasion, the members of the Warwickshire Agricultural Society were granted full privileges of membership of the Royal Agricultural Society at the Show.

T. B. TURNER.

16 Bedford Square,
London, W.C.

LIVE STOCK AT THE WARWICK SHOW.

THE Warwick Meeting was held under the shadow of a double cloud. On the one hand the year was one of very acute agricultural depression, while on the other hand there occurred, some three weeks before the opening date, a widespread and alarming outbreak of foot-and-mouth disease. At one time, indeed, the disease situation was such that it appeared to be only too probable that the responsible officials would be obliged to prohibit the movement of horned stock and pigs to the Show, as in fact they had done as regards the "Highland" only a fortnight before. Fortunately their prompt and energetic measures met with quick success and the great bulk of the country was clear in time to allow the Show to proceed almost normally. Some entries from those areas immediately affected were absent, but, upon the whole, the number of empty stalls was surprisingly small. It happened indeed that on the Tuesday of the Meeting a fresh outbreak occurred in Buckinghamshire, in consequence of which about a hundred head of stock had to be removed from the yard and quarantined in an adjoining field. Moreover, the occurrence of disease put an end to any prospect of an export trade in stock, but that prospect was not particularly bright at the best. Despite all difficulties Warwick saw a very representative collection of the British breeds.

HEAVY HORSES.

Considering the discouragements that Draft Horse breeders have suffered during the past ten years, interest in the breeds has been surprisingly well maintained. A dwindling town market, a down-to-grass policy on the land and a steady increase in the use of tractors on the remaining arable have combined to create a large surplus and so to depress prices to a most unprofitable level. But breeding operations have been curtailed until the output of foals is now little more than a third of the normal



Photo by]

[G. H. Parsons.

FIG. 1.—CLYDESDALE STALLION, "BENEDICTINE."
Winner of Champion Prize for best Clydesdale Stallion, Warwick, 1931.
Exhibited by MESSRS. T. & M. TEMPLETON.

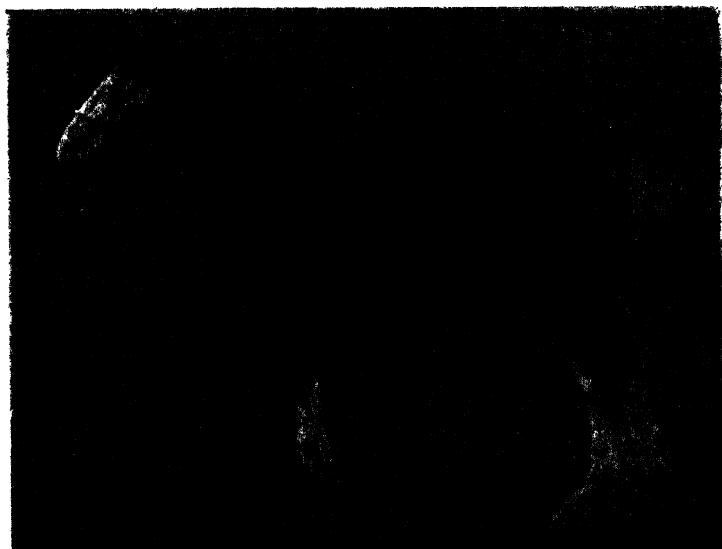


Photo by]

[G. H. Parsons.

FIG. 2.—CLYDESDALE MARE, "BRUNSTANE PHYLLIS."
Winner of Champion Prize for best Clydesdale Mare or Filly, Warwick, 1931.
Exhibited by MR. ROBERT PARK.

pre-War number, and the statistical position, from the breeder's point of view, is at present extremely sound. Indeed, the number of young horses that will be available in the next few years will be quite insufficient to make good the wastage of horse-flesh upon our farms, without reckoning on any town demand. The outlook for the breeder is far more hopeful than it has been since the end of the War.

The number of Shires exhibited, though hardly what one would have liked to see at a Royal Meeting in the heart of the Midlands, was yet well up to the average of recent years. It was, moreover, a heartening thing to find a fair number of Warwickshire farmers showing against eminent breeders from all over England. The County had the credit of producing, among other very meritorious exhibits, the reserve champion colt. Except in the class for three-year-old stallions there was good all-round competition; the gelding class was a credit to the breed and the female champion—a two-year-old filly—would have stood comparison with the best of her age that the breed has produced.

Clydesdales were a small entry and there were a good many absentees even from the short catalogue lists. Thin Clydesdale classes are not unusual when the "Royal" happens to meet at a distance from the Scottish Border, but one especially missed the long array of powerful clean-legged geldings that has been a feature of many recent Shows. Nothing is more useful, for purposes of interbreed comparison, than representative lots of aged geldings, for these represent the end-product of all the breeder's work. In the Clydesdale classes, it may be noted, three Firsts and one Second Prize went to the progeny of a single stallion. The history of this animal is an example of the old truth that a really good and impressive sire can hardly be valued too dear. He cost four thousand guineas at a time when a hundred good horses could have been bought with the money; yet he must have proved a very profitable investment to the buyer.

Entries of Suffolks were not quite so numerous as those of Shires, but the breed actually paraded rather stronger in numbers. It is doubtful whether a better lot of the breed has ever been seen at the Royal. The Suffolk's growing popularity, and its invasion of territories other than East Anglia, are points worthy of note. Perhaps the explanation may be that the Punch has always been a farm rather than a street horse, and that he is gaining on the Shire because the city market now counts for so little with the breeder. Also it may be that, with the disappearance of the heavy arable and the use of the tractor for the severest of the tillage work, a somewhat smaller horse with a correspondingly smaller requirement of corn is what the farmer needs; yet it can hardly be doubted that all the draft breeds,

including the Suffolk, are still tending to increase in weight generation by generation.

Clydesdale and Suffolk provided, as before, an interesting contrast not only in type but in feeding and management. Young Clydesdales are commonly shown almost as lean as rakes, partly with the idea of keeping the action close and straight and the pasterns supple, partly perhaps in the belief that a hard upbringing makes for a useful old age. On the other hand, the Suffolks are often almost pig-fat, and it is not an uncommon sight to see a yearling cocking on his pasterns and waddling on his legs from sheer excess of body weight. Making all allowance for the different standards of the breeders and the different natures of the breeds it is hard to believe that both extremes are right. There is much to be said for reasonably generous treatment, but surely nothing to be said for the fattening, of young growing horses.

Percherons were a good show, and it was well to see the prize-money more widely scattered than it had been in the previous year. Most British horsemen would probably agree that the breed, according to our ideas, is improving; the round ribs, the sound and shapely feet and the resolute action are still prominent merits, while fleshy hocks, round bone and twisting toes seem less conspicuous than they once were.

HUNTERS, PONIES AND HACKS.

It used to be said that cart-horse breeding was a poor farmer's business and hunter breeding a rich man's hobby; but recently the business has been a losing one while the hobby has in many cases been leaving a handsome profit. The hunter ring, on the Tuesday of the Meeting, was crowded outside with interested spectators and crowded inside with breeding stock well worthy of all the interest shown. Two such classes of brood mares have rarely if ever been seen before, and the young stock also reached a high standard. The classes for ridden hunters were not remarkable for numbers, but the general standard of quality was high. Hacks and Welsh Ponies were a good display. Among the Polo and Riding Ponies there were many beautiful specimens, but the mere layman may be excused if he was left a little puzzled as to the experts' definition of a Pony; the exhibits varied greatly in type, size and breeding, and the judges' task was anything but an enviable one. The Shetland Pony classes unfortunately had to be cancelled for lack of entries.

CATTLE.

Eighteen breeds of cattle were on view, the absentees being the South Devon, the White Park breed and the Galloway.

There were fair numbers of entries of the last, but the foot-and-mouth restrictions proved to be specially unkind.

Shorthorns attracted a goodly entry and probably, next to the hunters, the largest ring-side crowd. As has happened at most recent Shows the Shorthorn classes were entirely monopolised by animals of the Scottish type. The standard for Shorthorns has, of course, long been based entirely on beef points and specialisation has now gone so far that none of the old dual purpose types can hope for Showyard success unless their dairy qualities are good enough to enable them to compete in the Dairy Shorthorn classes. Many people hope that specialisation of the dairy type will not go too far, otherwise our greatest general purpose breed will be finally, for all practical purposes, split in two. Except that for two-year-old bulls the Shorthorn classes were well filled and quality was well up to standard. The decline in values, the disposal of many prominent herds, and the slaughter of a good deal of pedigree stock has not so far been reflected to any appreciable extent in the Showyard. The decline in the export trade, if it does not continue too long, may prove to be of ultimate benefit to the breed.

Among the Shorthorns, as among some other beef breeds of cattle and also some breeds of sheep, there were again a few examples of rather gross over-conditioning. It has sometimes been suggested that judges should penalise, more heavily than they do, exhibitors who present their animals in over-fat condition. But the problem is one of great difficulty. Capacity to fatten, even to a degree beyond butcher's requirements, is a necessary quality in certain breeds, for instance where bulls of a breed are used to beget commercial beef stock out of dairy cows, or where rams are used to cross with the lean and hardy mountain types of ewes. Moreover it does not by any means always happen that the reproductive functions are permanently impaired by fattening. When it is suggested that breeding animals should be exhibited in ordinary breeding condition it should be borne in mind that the judge would then be, to a considerable extent, deprived of the opportunity of judging the ability of the animal to fatten, or to fatten in the right way. Extreme cases, of course, require some kind of penalty, but it is no solution to suggest that breeding stock should be shown lean.

Herefords, despite general trade depression, had been in keen demand for export during the months before the Show, with the result that a good deal of the season's Show material had left the country. The result was a small if very select gathering of the breed. The extreme case was the class for old bulls, where one magnificent animal—probably the best Hereford that many breeders have seen—paraded in solitary state. Devons made an attractive display; one is tempted to wonder,



FIG. 3.—DEVON BULL, "ADMIRAL STUCKEY."
Winner of Champion Prize for best Devon Bull, Warwick, 1931.
Exhibited by MR. B. W. BEER.

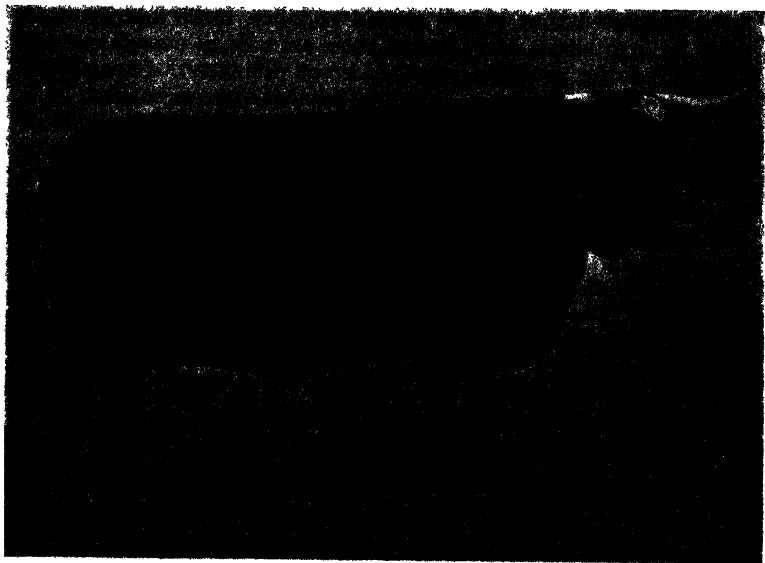


FIG. 4.—DEVON COW, "CLAMPITT DAINTY 10TH."
Winner of Champion Prize for best Devon Cow or Heifer, Warwick, 1931.
Exhibited by MR. GEORGE BRENT.

however, whether the Show type—beautiful, fleshy and full of quality as it is—still represents what a majority of Devon breeders are aiming at. One hears a good deal about milk production and milk recording in the home district, whereas there is little indication of dairy breeding in the general run of Showyard exhibits. The tendency of breeds to split up into different types is not surprising when so many farmers are turning from beef to milk and from arable to grass; yet we have enough breeds and types already, and we do not want more. The Show type should represent the nearest approach to a common breed ideal, and not something essentially different from the commercial type.

Sussex cattle were just a fair average collection, except for the champion cow, which was one of those animals that the lucky breeder produces perhaps once in a lifetime—so near to perfection as to make ordinarily good cattle look common by comparison. Interbreed comparisons are difficult to make under ordinary circumstances, but the opinion was several times expressed that Lock Knelle 2nd was the finest beef cow in the Show; moreover she looked like giving a very fair yield of milk, as even a beef cow should.

Welsh Blacks were rather fewer than at the previous Show, and quality was just about average. The Longhorns, having the Meeting right in the midst of their home country, turned out to the number of nearly thirty head. This old breed adds a touch of the picturesque to the cattle parade and vies with the Belted Galloway and the Dexter in exciting the interest of the town visitor to the Show; whether it will ever win back a place of any importance in the cattle industry of England is, however, very doubtful.

Some notable Scottish entries were unavoidably absent from the Aberdeen Angus classes, but there are nowadays enough first-class English herds to put up a show without any assistance from north of the Border. Scotland indeed carried off the male championship and the reserve, but England had the credit of the corresponding prizes for females, while in the final contest for the supreme championship the English heifers defeated the Scottish bulls. There was perhaps an absence of very outstanding animals but (at least in the heifer classes) this was due to uniformly high merit. Belted Galloways were less numerous but definitely more uniform in quality than in the previous year, when there were rather long tails to some of the classes. One gathers that many herds of "Belties" are bred on dual purpose lines, but there is now little sign of dairy qualities in the Show specimens. Indeed, the Show "Beltie" seems to be little different, except in colour, from the ordinary black type of the breed, and to be getting more like it year by year.

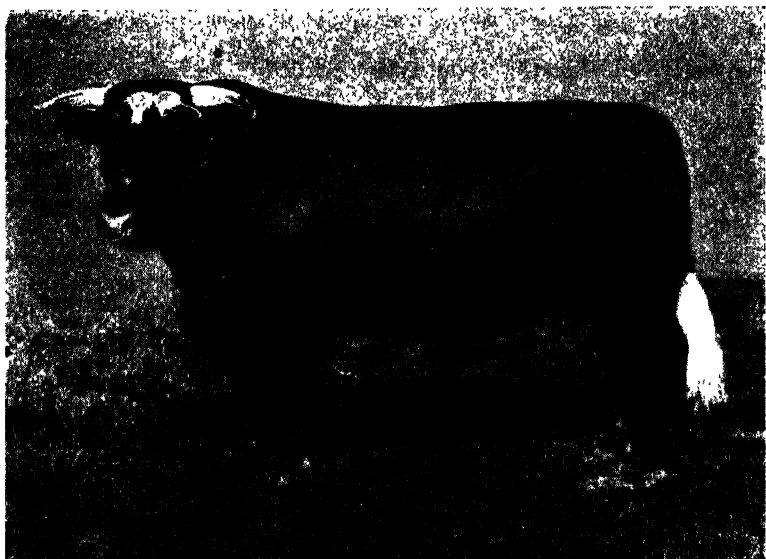


FIG. 5.—SUSSEX BULL, "CROWBOROUGH WARREN MARKSMAN 6TH."
Winner of Champion Prizes for best Sussex Bull, Warwick, 1931.
Exhibited by MR. EDWARD HURTLEY.

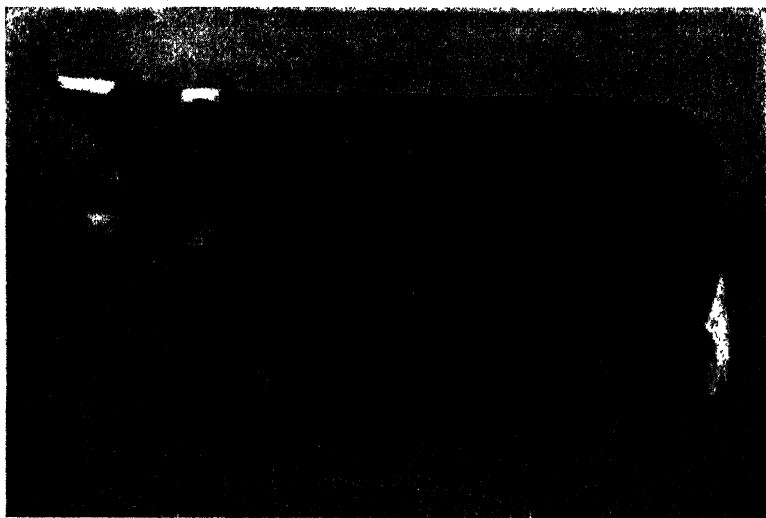


FIG. 6.—SUSSEX COW, "LOOK KNELE 2ND."
Winner of Champion Prize for best Sussex Cow or Heifer, and Challenge Cup for best Sussex animal, Warwick, 1931.
Exhibited by LT.-COL. J. E. WARREN, O.B.E., M.C.

The Dairy Shorthorn, as befits the largest and most widely distributed of our breeds, has in recent years regularly produced the largest entry in the cattle section ; it did so again at Warwick with a hundred and seventy-five head. The bulls, judged by previous standards, and taken as a whole, were of no more than moderate quality. Females, on the other hand, were an excellent collection. The senior cow class was headed by three whites, the first two being of north-country breed, with all the characteristic scale and substance that the north-country breeder especially admires. There were sixteen entries for the special prize offered by the Dairy Shorthorn Association for young bulls of full milking pedigree. The winner and the reserve had been placed first and third in their respective classes, a fact that provides pleasing evidence of the success that is being secured in combining Showyard excellence with real dairy breeding.

Lincolnshire Red Shorthorns made a creditable display. The cleavage of type and breeding within this variety is almost as distinct as that in the main body of the Shorthorn breed, and the classification provided at the Royal Show is an interesting, if not altogether satisfactory compromise between two distinct ideals. This year, as usual, the classes for bulls and young heifers were monopolised by the beef men. Two special classes were provided for females in milk "showing the best dairy properties" and were naturally filled with animals of quite different type and breeding. The open class for cows in milk included specimens of both strains, and provided a difficult problem to the judge.

Those persons who argue that a real dual purpose type of cattle is an impossible ideal would have been hard put to it to maintain their case outside the Red Poll ring. This breed is undoubtedly improving in general symmetry—notably in regard to the symmetry of the udder. Thousand-gallon records are now very commonplace achievements, while the early maturing and fleshing qualities are being fully maintained. Moreover, as a study of pedigrees will show, there is no tendency for a beefy strain to monopolise the non-milking classes. Breeders deserve to be congratulated on their firm and constant adherence to their principles.

The Blue Albion classes were a very distinct improvement on those which were seen at Manchester in the previous year, yet hardly up to the level of some earlier Shows. It is indeed difficult to see how this breed can make as consistent or steady progress as others ; genetical science seems to hold out no hope that blue-grey colour, which is the only one permissible in the breed, can ever be fixed as a true-breeding characteristic, and the necessity of having to discard otherwise good breeding

material, for no fault but colour, must act as a heavy handicap to progress.

British Friesians, in regard to numbers, stood second to the Dairy Shorthorns and beat the Red Polls by fully a dozen head. Friesian breeders have set themselves a very high standard for the "Royal" Exhibit and, taking one class with another, the standard was about maintained. The cow class has sometimes been more impressive. On the other hand the yearling bulls and all the classes for young heifers were very strong indeed.

The Guernsey, as a commercial dairy cow, is finding more supporters year by year. As the glass bottle becomes the standard vessel for delivering milk to the consumer, the housewife naturally becomes a good deal more critical of the quality of the milk that she receives, in so far at least as the quality can be judged by appearance. The two criteria are, of course, the colour and the thickness of the cream layer, and although these are by no means a complete measure of quality in the chemical sense they are some indication; in any case the quality which the consumer wants must be the producer's guide. These facts probably account in some measure for the growing popularity of the Guernsey, whose milk not only is rich but looks rich. Many large producers, working on the better sort of dairy land, are now convinced that the cheapest way to produce milk of good standard quality is to depend upon the Friesian for quantity and to tone up the product to the desired extent by a blend of the Guernsey vintage. The breed, from the Show point of view, has been markedly improved in recent years. High tails, dipping loins and loose shoulders are much less obvious than they used to be, while in symmetry of bag the breed is now little inferior to the Jersey, which has been a favourite show cow for much longer.

Jerseys were more numerous and of quite as high average merit as at the 1930 Meeting, the big class of cows being perhaps the outstanding feature. Ayrshires were a much more representative group than they have sometimes been, and it is noteworthy that, as in the case of the Aberdeen Angus, the section is becoming much less dependent upon Scottish entries. The extension of dairying into the poorer upland districts is undoubtedly one cause of the breed's southward spread. Herds have increased very rapidly in Northumberland and the breed is now to be found here and there in the Chilterns, the Cotswolds and on the Downs, where the conditions would have been thought, a few years ago, to preclude successful milk production. Another factor is possibly the increased demand for the higher grades of milk, for there is a good deal of evidence that the incidence of Tuberculosis is less severe in the Ayrshire than in most dairy breeds.

Among the *Kerries* there were many very useful-looking cows and heifers, and what seemed, to un-expert eyes, a collection of rather plain bulls. This, however, cannot have been the expert opinion, for two bulls, father and son, were respectively champion and reserve champion of the breed. *Dexter* cows were very good and there were fine specimens at least to head the other classes, if some of these tailed off more than they should have done.

SHEEP.

Classification was provided for twenty-one breeds of sheep, but two of these, the *Dorset Down* and the *Leicester*, failed to produce the necessary minimum number of entries.

Wensleydales were reduced, through the operation of foot-and-mouth Regulations, to the entries of a single exhibitor; *Border Leicesters* suffered to some extent from the same cause, but enough were forward to provide more or less competition in every class.

In the matter of numbers the *Down Breeds* were all well represented and the quality was good. *Southdowns* led with sixty-six pens, *Suffolks* followed with fifty-seven, and the *Oxford*, *Shropshire* and *Hampshire* had each about forty. From one point of view this class of sheep is declining in importance. The sheep population of the poor chalk and oolite country, which formed their main stronghold, has been declining for many years; moreover, even in these areas there is a large proportion of the grass-land breeds, and the process of replacement goes on from year to year. It is true that this does not apply equally to all the breeds, and possibly not at all to the *Shropshire* which is less definitely an "arable" sheep, and is not associated with the area indicated. In another sense, however, the *Downs* were never more important than they are to-day, for they produce the kind of mutton that the consumer, with growing insistence, is demanding. Nowadays, however, the necessary proportion of *Down* blood in our commercial butchers' sheep is being obtained more and more by the use of *Down* rams upon ewes of other types and less and less through the medium of *Down* ewe-flocks.

The *Down* varieties remain very distinct—probably they are becoming more distinct—in respect of their breed characters—face colour, wool distribution and the like—but they would seem, in regard to their commercial characteristics, to be converging to some extent. This change is probably taking place in response to the demands of commercial men for rams specially suited to the crossing business. At any rate the modern *Hampshire* is a good deal lighter and narrower in the head than his forebears; the *Suffolk* is becoming markedly blockier, shorter on the leg and more thickly covered over the back, while the

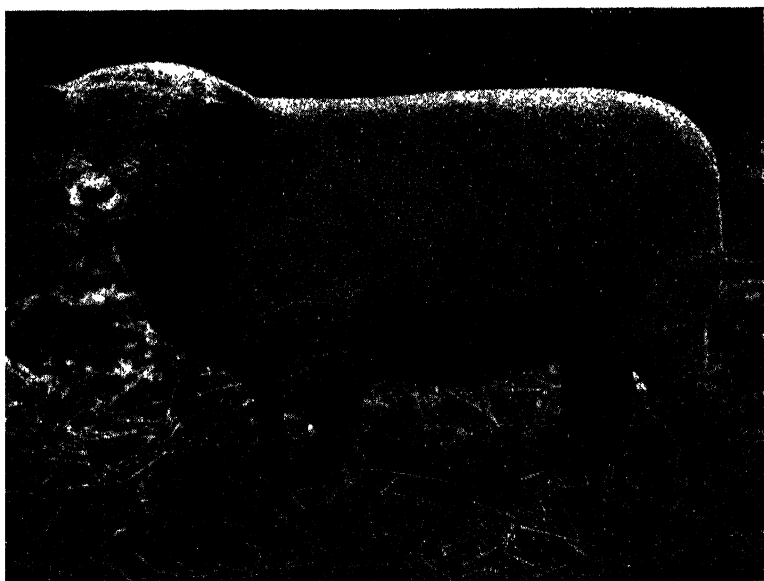


FIG. 7.—SOUTHDOWN TWO-SHEAR RAM, "FORD 16 OF 1929."

Winner of Champion Prize for best Southdown Ram, and Challenge Cup for best exhibit of Southdown Sheep, Warwick, 1931.

Exhibited by MR. JOHN LANGMEAD.

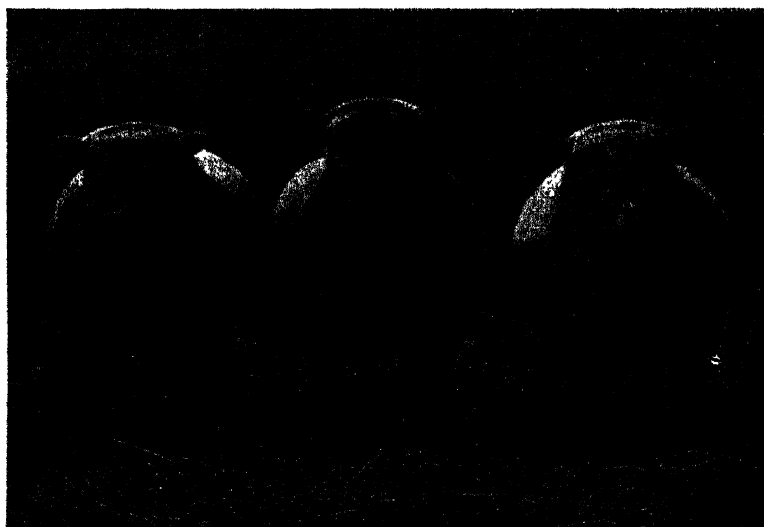


FIG. 8.—PEN OF THREE SOUTHDOWN SHEARLING EWES.

Winners of Champion Prize for best Pen of Southdown Ewes or Ewe Lambs, Warwick, 1931.

Exhibited by MR. JOHN LANGMEAD.

Oxford is improving in smoothness and leanness of flesh and now shows, apart from his size, less trace of the Longwool blood in his ancestry. The Southdowns indeed still remains, of all our breeds, the most perfect in symmetry and fleshing qualities, but it does not seem to increase in size; and despite the movement in favour of ever smaller joints it is still regarded, for many commercial purposes, as too small.

Dorset Horns were few but good. One looks forward to a larger muster at the Southampton Meeting, which will be within very easy reach of the breed's home country. Wiltshire or Western Horns put up a better exhibit than they have ever done before. The breed still strikes one as rather a startling departure from the conventional type of mutton sheep, yet it seems now to be steadily increasing in numbers. Few breeds are less alike than the Wiltshire and the Southdown, and it is a curious fact that they are employed for essentially the same purpose—namely for crossing with small ewes, such as Welsh Mountain, for the production of fat lambs. Experience shows that whereas of course the Southdown crosses are much superior in quality the progeny of the Wiltshire reach market weights in a shorter time and so become available when marketable lambs are still scarce.

Ryelands, especially on the female side, were less numerous than might have been expected, but no fault could be found with the quality. Kerry Hills had an entry of fifty pens, mostly from the home district but with a considerable sprinkling from Counties as far apart as Cheshire and Surrey. From the show point of view this breed is undoubtedly making good progress, but it is perhaps doubtful whether the improvement is all clear gain. We are very well supplied with breeds of sheep combining size, mutton conformation and early maturity, whereas we have all too few that are capable of providing the flocks of hardy, prolific ewes to stock our growing area of poor grassland. It will be a pity if the Kerry Hill is "improved" out of its class as a true hill sheep. Olun Forests, which are comparatively new-comers to the Royal, put up a good display.

In the absence of most of the other big Longwool breeds such as Leicester and Cotswold, the Lincolns seemed more outstanding than ever in respect of massiveness of carcass and wealth of fleece. With the trend of the home consumer's demand and the intense depression in the wool industry overseas, Lincoln breeders have been passing through hard times, yet their sheep would seem to have a permanent place in the industry; the wool of the pure-bred sheep is practically irreplaceable for the manufacture of specially strong fabrics; moreover, the Lincoln is recognised as the best all-round cross for Merino ewes where the combination of fleece and carcass qualities is desired, and



FIG. 9.—PEN OF THREE HAMPSHIRE DOWN RAM LAMBS.

Winners of Champion Prize for best exhibit of Hampshire Down Sheep, Warwick, 1931.

Exhibited by the Exors. of the late JAMES GOLDSMITH.

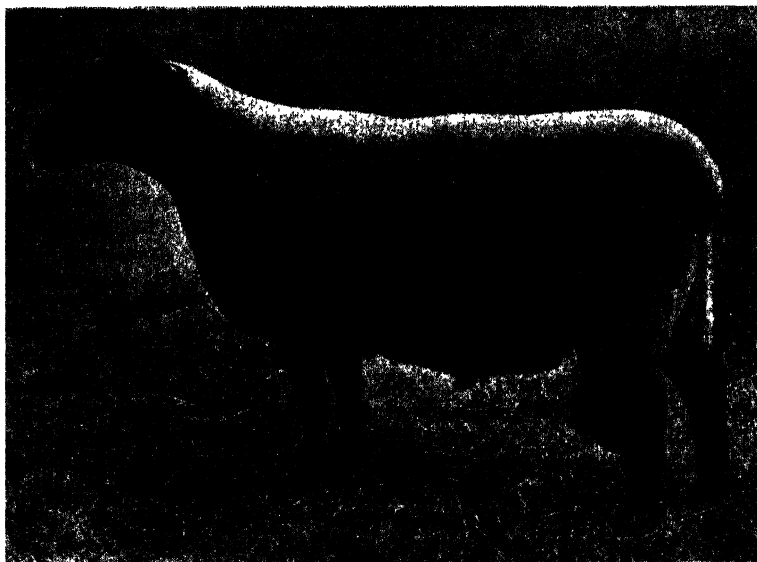


FIG. 10.—SUFFOLK TWO-SHEAR RAM.

Winner of Champion Prize for best exhibit of Suffolk Sheep, Warwick, 1931.

Exhibited by the EARL OF RILLYMERE.

the Merino is still by far the most numerous breed in the world.

Unlike most Longwools the Border Leicester and the Wensleydale are increasing in importance and influence. More and more the requirements of flock-masters in the lowland grass countries are being met by supplies of cross-bred ewe lambs—half breeds, mules and mashams—from the hills and mountains, and the two northern Longwools are now bred almost exclusively to provide the necessary crossing sires. Their comparative merits for this purpose make a subject for a pretty argument. In the very important matter of prolificness they stand first and second among our breeds, but the evidence as to their relative positions is conflicting. Border Leicesters at Warwick were a fairly representative collection, but the Wensleydale classes, for reasons already indicated, produced no real competition. The Romney Marsh classes were tolerably well filled, but one has been accustomed to see a larger collection; quality, however, was first rate. There was a fair show of South Devons which, despite their great size, retain a very considerable popularity in their home district. The fashion for small joints, whether of beef or mutton, does not seem yet to have penetrated to the south-west.

The mountain and moorland breeds, considering their vast numbers in the country, have never been adequately represented at the Royal. At Warwick indeed there was a very fair show of the Welsh Mountain and of its Black variety. A few Dartmoors and a dozen Cheviots completed the section. The last is both a beautiful and a useful breed, but surely there is a danger that head and ear points may become an obsession with breeders of the Border type. The larger and perhaps less hardy (though equally useful) type from the extreme North of Scotland is scarcely seen in the Showyard.

Pigs.

Nine breeds of pigs were forward, the numbers presented varying from thirty in the case of the Essex to nearly two hundred in that of the Large White. The judge of Large Whites could indeed fairly claim to be the hardest-worked man in the Show, for of his eight classes the smallest had fifteen and the largest a full three dozen entries. This breed, in good times and bad, has maintained its popularity in a very consistent way ever since serious attempts in pig improvement began. To-day its position as the world's premier bacon breed seems to be more secure than ever, while the public demand for ever leaner joints of meat is leading to its increasing use for pork production. If there is any room for criticism of present tendencies one might suggest that some breeders are going a little far in the direction of size, and even in the matter of length of body. Capacity for

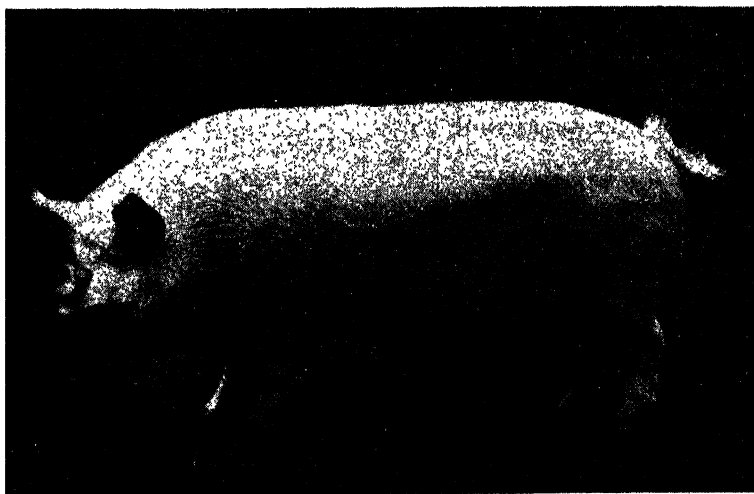


Photo by]

[O. Hosegood.

FIG. 11.—MIDDLE WHITE BOAR, "FORDON MARMION."
Winner of Champion Prize for best Middle White Boar, Warwick, 1931.
Exhibited by MESSRS. CHIVERS & SONS, LTD.

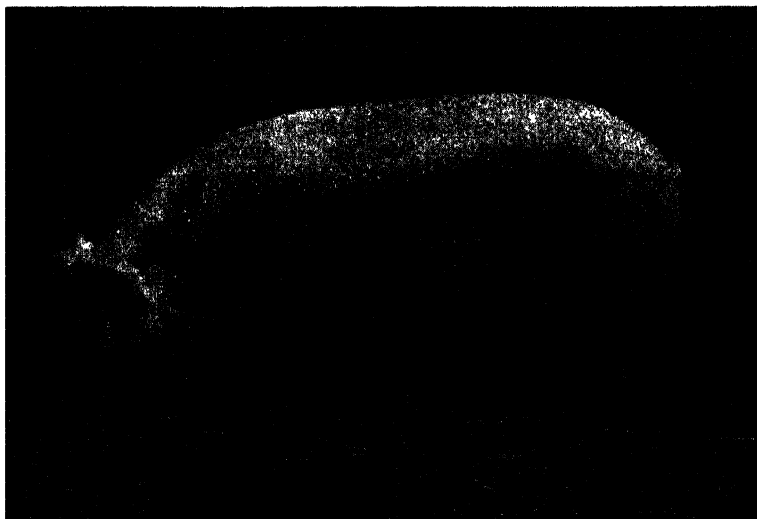


FIG. 12.—MIDDLE WHITE BREEDING SOW, "AMPORT HELAN 6TH."
Winner of Champion Prize for best Middle White Sow, and Challenge Cup for best Middle White Pig, Warwick, 1931.
Exhibited by MR. LESLIE K. OSMOND.

rapid growth, up to the age of seven or eight months, is of course a quality of immense importance to the commercial pig keeper. Without this capacity all our modern knowledge of nutrition is of little use ; and there is no doubt that, other things being equal, the largest breeds grow fastest ; on the other hand where great size is reached as a result of prolonged slow growth it cannot be regarded as a merit.

Middle Whites were rather fewer than they have been in recent years but in respect of numbers were again a good second, while in the whole exhibit it would have been hard to find a seriously faulty specimen. The breed would seem to be tending towards greater length of body, and the old fault of excessive shoulder development is now fast disappearing. Tamworths, having the Meeting right in the midst of their home country, turned out in very fair numbers, and the general level of merit was better than most people could remember.

In the Berkshire section the males were not particularly noteworthy but the quality on the female side was good. The breed is still very widespread geographically, but is, owing to the great gaps that the past few years have made in the ranks of the old breeders, getting into fewer hands. At Darlington in 1920 there were twenty-four exhibitors in the section, and of these no single one was among the twelve who showed at Warwick. The Warwick prize list was remarkable in that no less than six of the eight first prizes went to one herd.

The more recently established breeds of pigs have been freely and often condemned during the past year or two as superfluous or worse, yet it must be admitted that they show no particular signs of fading out. The Cumberland indeed failed to produce the necessary minimum of entries, but the Gloucester Old Spot came back, after a year's absence, stronger in numbers and better in quality. Large Blacks stood third in regard to numbers and were a particularly uniform and attractive lot. Essex, which are still rather strictly confined to their name County, were rather down in numbers, but Wessex, which are spreading ever more widely, were well up. The Long White Lop Eared breed of the south-west appeared, for the sixth successive year, in about its usual force and quite up to the highest level of merit that it has reached in the past.

J. A. S. WATSON.

School of Rural Economy,
Oxford.

REPORT ON NEW IMPLEMENTS AT THE WARWICK SHOW, 1931.

GENERAL SUMMARY.

THIS year there were eight entries of new implements for the Silver Medal, an increase of two on last year, in spite of the very severe conditions of testing, which makers are aware that machines put in for the Silver Medal now have to undergo. They grouped themselves into the following classes, *viz.*—I. Cultivating Machinery; II. Dairy Machinery; III. Harvesting Machinery, and IV. Barnyard Machinery. The entries were as follows:

Class I contained two entries. One was a Crude Oil Tractor fitted with 4-cylinder, 4-stroke Diesel engine. A Silver Medal was awarded for this entry. The entrants were Richard Garrett & Sons, Ltd., Leiston, Suffolk. Price £525.

The other entry in this class was a Spraying Machine, entered by Aktieselskabet Kartoff, Copenhagen, Denmark. Price £38. Its new feature was the use of a rotating disc for producing a fine spray. This entry was deferred, and given leave to re-enter next year.

Class II included a Milking Machine with a mechanically operated diaphragm pulsator which is mounted together with a trap on the lid of the milk pail and accompanied by ingenious cleaning tools; entered by Gascoignes (Reading) Ltd. Price £75, upwards. It was awarded one of the Society's Silver Medals.

The other entry in this class was a Milk Cooler described as a Wessex Ethylor Milk Cooling Plant by the entrants, Wessex Refrigerator Plants, Ltd., Wells, Somerset. Price £112.

Class III contained three entries. One was a Harvester-Thresher made by Clayton & Shuttleworth, Ltd., Lincoln. Price £550. This machine was entered at last year's Show, and deferred by the Judges for one year in order to enable a further trial to be carried out to ascertain its suitability for English conditions. It was now awarded a Silver Medal.

Then there was a mowing machine with an oil bath for the gears in which the oil is lifted from the bath by a special disc, thus avoiding churning; described as Bamford 5 R.A. Oil Bath Mower. Makers, Bamfords, Ltd., Utttoxeter. Price £26.

The other entry in this group was a mowing machine, also with an oil bath for the gears, in which provision was made for forced lubrication by means of a pump, described as the Albion Mowing Machine. Makers, Harrison, McGregor & Co., Ltd., Leigh, Lancashire. Price £27.

Class IV contained an electric motor mounted inside a reel constructed of sheet metal in the form of an easily handled cable drum described as a "drumotor" by the entrants, The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. Price £45 10s. A Silver Medal was awarded to this entry.

TESTS.

All entries were carefully and thoroughly tested by the Institute of Agricultural Engineering prior to the Show. The Judges were therefore in an extremely favourable position, as they were able to inspect the entries at their leisure while under test some time previous to the Show. The tests carried out were most thorough and afforded the Judges ample data for basing their awards. Such tests must make the Silver Medal awards of great value to the manufacturers of such implements, certainly far in excess of the fee charged for each entry. The writer would, however, again mention that, in his opinion, power-driven machines should be tested by means of electric motors and electric dynamometers (as was done in the case of the Garrett oil tractor), since in this way even more accurate measurements of power consumption, friction losses, etc., would be obtained.

GENERAL DETAILS.

It may now be well to consider the entries in more detail. The following notes are based on the writer's observations both during the practical tests and again later in the Showyard. While it is impossible in a short report of this nature to refer to all the details in the machines entered, every endeavour is made to refer to the outstanding and new features of each machine, more particularly bearing in mind the needs of the practical farmer, in the hope that such notes may serve as a guide to prospective purchasers.

Class I. Cultivating Machinery.

The Garrett Crude Oil Tractor. Awarded a Silver Medal (Fig. 1). Undoubtedly a high-speed multi-cylinder Diesel engine is ideal for a tractor. Its introduction in farm tractors will inevitably lead to considerable economies in fuel consumption, etc. Also—a not unimportant matter—it utilises a class of fuel that no one wants to steal or borrow.

This tractor is of the wheel-type with a nominal rating of 23/40 h.p. The engine, which is a four-cylinder four-stroke Diesel, is made by Messrs. Aveling & Porter, Ltd., and is governed to run normally at 1,150 r.p.m. It is slightly larger than that entered for the World Tractor Trials last year. The engine can be started either by an electric starter, as in a car or lorry, or by

hand. There is a three-speed gear-box, giving speeds of 2.88, 3.88 and 5.6 m.p.h. forward, and a reverse speed of 2.88 m.p.h.

The weight of the tractor is about 7,500 lb. Its wheel base is 88 in., the mean turning radius being about 17 ft. 9 in. The pressure per square foot on the field surface is comparable with other tractors and less than that of a horse.

The Diesel engine is, of course, far superior to the petrol or paraffin engine as it is simpler, there being no magneto, sparking-plugs, carburettor or vaporiser, and also there is no excessive dropping of power at reduced engine speeds. On a belt test the tractor developed 43.3 h.p. at 715 r.p.m. consuming 0.61 lb. of

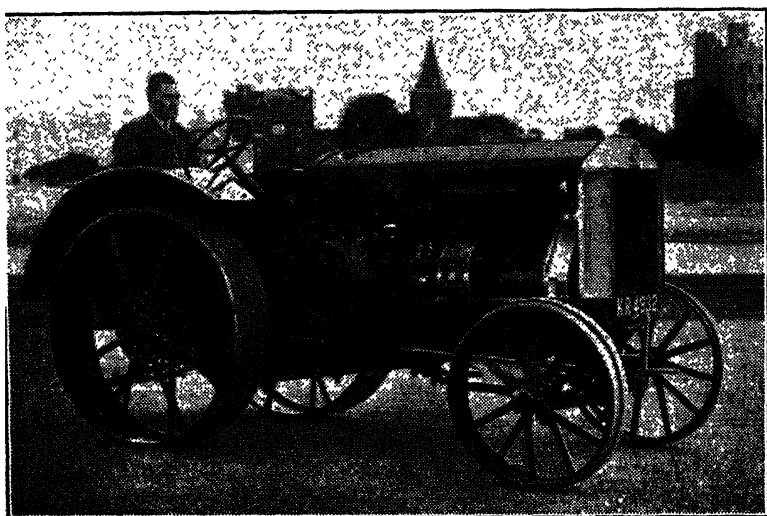


FIG. 1.—The Garrett Crude Oil Tractor.

fuel per h.p.-hour. On a maximum draw-bar test at 2.96 m.p.h. the mean draw-bar pull was 3,792 lb. and the mean draw-bar power was 30 h.p. The wheel slippage was 9 per cent. On the rated load of the tractor at 3.26 m.p.h. with a mean draw-bar pull of 2,331 lb., the mean draw-bar power was 20.3 h.p. with a fuel consumption of 0.74 lb. per h.p.-hour. If a comparison is made with the data collated in the report of last year's World Tractor Trials, it will be noted how very favourable are the above figures.

These four-cylinder engines with their high speeds and even torque give that steady drive which is essential to good ploughing. When this tractor was on test it was found that the draw-bar fuel consumption was the least recorded in this country,

while the consumption of lubricating oil was very low. After a run of 24 hours at its rated draw-bar horse-power it was found that the lubricating oil consumption for the period was 10.4 lb., or an average of 0.43 lb. per hour.

Under suitable conditions it is claimed that this tractor will plough $1\frac{1}{2}$ acres per hour on one gallon of fuel, at a cost of about $4\frac{1}{2}d$. The tractor was found to be reliable in operation and the operating costs should be appreciably lower than those of the ordinary paraffin tractor.

To sum up, this tractor may be described as a remarkably fine piece of English engineering workmanship that should long outlast the average tractor. It was a pleasure to an engineer to look at it.

The Kartoff Spraying Machine. This Danish Spraying Machine consists of a wooden barrel tank with a capacity of about 70 gallons mounted on a two-wheel steel chassis. The track of the wheels can be varied from 48 in. to 58 in. by sliding the wheels on the axle. The spraying effect is obtained by means of a shallow circular grooved dish, without any radial paddles, which revolves rapidly about a nearly vertical shaft at the rear of the chassis.

The spraying liquid is lead by gravity through a one-inch pipe on to the upper side of the dish. The dish rotating mechanism consists of a chain drive and worm gear from a sprocket-and-dog clutch on the main axle which is driven by the land wheels. A paddle agitator is fitted inside the container tank which can be operated from the driver's seat. The rate of application can be regulated by the driver from his seat. This can be varied from 35 to 105 gallons per acre.

Obtaining a fine spray by means of the rotating dish has the special advantage that stoppages through choking are avoided; cheaper spraying mixtures can also be used as the liquid does not pass through a nozzle; in fact, the only pipe used is the one of one-inch diameter.

This machine worked very satisfactorily at the Tests after certain minor mechanical faults had been corrected. The machine can easily be drawn by one horse. No choking at any time was experienced and the spray was applied uniformly in a fine mist over a width of about 11 ft. There was no tendency for the spray to be thrown forward on to the legs of the horse. This machine has not reached its final practical stage of design, but as it was most promising, it was given leave to re-enter next year.

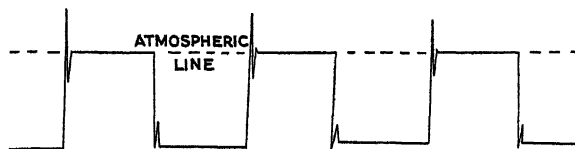
Class II. Dairying Machinery.

(a) *The Gascoigne Milking Machine.* Awarded a Silver Medal. This milking machine employs a diaphragm pulsator as distinct

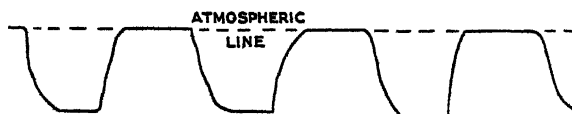
from the piston type. There is of course considerable difference of opinion as to the merits and demerits of adjustable and fixed pulsators. While both forms are liable to be unsatisfactory when abused or carelessly handled, both can also be very successfully operated when properly handled. One of the drawbacks with the old type of diaphragm pulsator was that when a split liner occurred the milk was drawn into the diaphragm chamber, necessitating the dismantling of the pulsator in order to clean it. In the Gascoigne machine, however, the pulsator is mounted, together with an improved trap, on the lid of the milking pail and in the event of a split liner the milk does not enter the diaphragm chamber, but is drawn past a slide valve and thence into a moisture trap. This was tested by actually splitting a diaphragm. The claw piece is also of an unusual and improved easy-clean design. In the older types, it was not easy to pass a brush through the milking nozzles or to inspect the passages through which the milk passed. In this machine, however, a brush can easily be passed through the nozzles and every part which comes into contact with the milk can easily be inspected. New teat-cup and milk-tube cleaners of very ingenious design, that replace bristle brushes, are also provided with this machine. They consist of brass rods fitted at one end with a cotton-reel-like fitting of one-sixteenth of an inch larger diameter than the rubber tubing to be cleaned. On pulling this reel through, it thoroughly cleans out the tubing. This method is probably not superior to the brush method, but of course, the life of the cleaner is longer. The moisture trap which has now been incorporated with this machine is a decided improvement, owing to its increased capacity and the absence of a number of small parts that was common in the older types. A ball valve is fitted in the outlet trap to ensure that the vacuum in the pail is not destroyed by air entering when the supply lines are disconnected. This feature operated extremely well in the tests. Fig. 2 shows the indicator diagrams of this machine. These were taken by the Institute of Agricultural Engineering with calibrated instruments. In the ideal milking cycle there should be full suction applied to the teat for one half the period and complete relief during the other half, the change-over being as nearly instantaneous as possible. It will be seen from the diagram that the graph of this machine coincides closely with the ideal theoretical diagram.

The erection of the vacuum piping for milking machines is usually an expensive job, owing to the necessity for screwed joints for the milking pail cocks at every 7 ft. or so. However, the new Gascoigne tee-piece obviates this as it can be fixed anywhere on a length of pipe, with no more work than the drilling of a hole at the required position. From the stand-

INDICATOR DIAGRAMS
FOR
GASCOIGNE MILKING MACHINE.
SPEED: 45 PULSATIONS PER MINUTE.

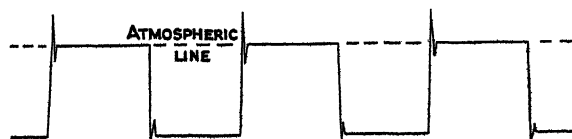
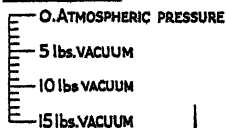


UPPER PULSATOR NOZZLE

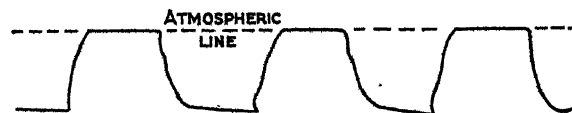


TEAT CUP CONNECTED TO ABOVE

VACUUM SCALE



LOWER PULSATOR NOZZLE



TEAT CUP CONNECTED TO ABOVE

FIG. 2.—Indicator Diagrams for the Gascoigne Milking Machine.

point of ease of cleaning the machine is an improvement generally over earlier models.

A short milking trial of the machine was carried out at the National Institute for Research in Dairying, which extended over five weeks. During the period of the test, the yields from the test cows and the composition of the milk remained satisfactory. No deleterious effects of any kind were observed either on the cows or on the milk. The rate of milking was satisfactory.

(b) *The Wessex Ethylor Milk-Cooling Machine.* (Fig. 3.) The refrigerant employed in this machine is Ethyl-Chloride, which is compressed by a rotary compressor and then cooled

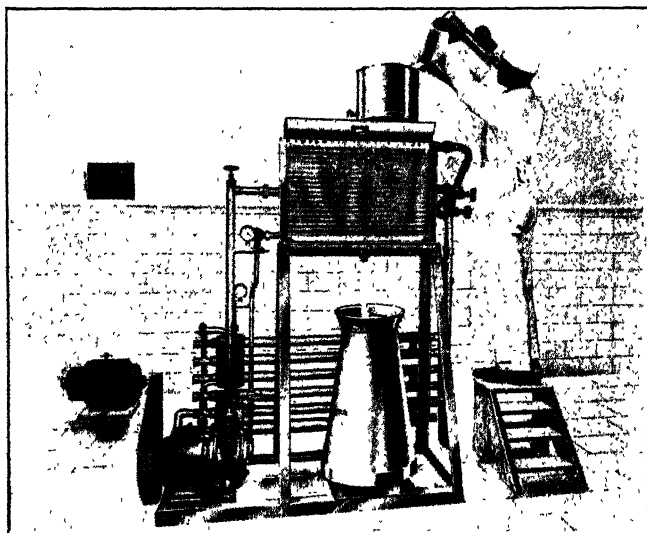


FIG. 3.—The Wessex Ethylor Milk-Cooling Machine.

through a water-cooled condenser. The refrigerant is released into the lower half of the milk cooler, where it expands and produces a very low temperature, cooling the milk in the process. The refrigerant is then returned to the compressor. A special glycerine-base lubricant is employed, as ordinary lubricating oil is not effective with this refrigerant. The milk is cooled in two stages by passing over the corrugations of a fixed unit of the usual familiar pattern; in the upper half, the ordinary water supply is employed for the preliminary cooling, while the lower half contains the refrigerant. The machine works at a pressure of only 8 lb. per square inch—which means a long life before repairs are necessary. It is estimated that approximately 31

gallons of milk per hour can be cooled from a temperature of 90° Fahr. (32.2° Cent.) to 40° Fahr. (4.4° Cent.). Generally, the machine is of very compact design. Unfortunately the entrants of this exhibit did not comply with all the rules of the Society respecting new implements, hence no conclusive data relating to the actual performance of the machine were obtained.

Class III. (a) Harvesting Machinery.

The Clayton Harvester-Thresher (Fig. 4). Awarded Silver Medal. This English-built machine was entered at the 1930 Show and deferred for one year to enable further trials under British conditions to be carried out to ascertain its suitability for English conditions.

At the request of the Society, the writer inspected this machine at work in August, 1930, so as to prepare a report for the benefit of the Judges for 1931. He was a little prejudiced in that though he had seen this class of machine abroad—it has now been in use for over 25 years—where it operated well, he was very dubious as to its satisfactory and practical working under English weather and crop conditions. However, he has been converted and is pleased to state that this machine proved to be a most useful appliance and is of the type that can be commended to British farmers who have a sufficient area under corn—say 500 acres—to keep it in operation long enough to repay the interest and depreciation upon its capital cost. For contractors in corn-growing areas in this country it can be strongly recommended.

The tests were conducted under the auspices of the Oxford Institute of Agricultural Engineering by the courtesy of Mr. G. H. Neville on his farm at Wellingore. At the same time the writer took the opportunity of viewing the fields which had been harvested under the adverse conditions of a thin crop, short straw, excessive weeds and heavy clover, by this same machine on the estate of Lord George Seymour and the threshed crop which had been obtained from these fields. It was interesting to note that the heavy clover crop was undamaged. During the tests the machine harvested about 50 acres of wheat and barley successfully under the most adverse weather conditions. The machine delivers an excellent sample of malting barley. To the objections which are sometimes raised as to the portability of this type of machine, the reply is that the whole machine can be dismantled in a little over half an hour and will pass through a 12-ft. gate. So far as the width of gates in this country is concerned, it is surprising how easy it is to remove a gate post and level the hedge sufficiently to admit the machine into the field (of course a couple of heavy timbers should be placed over any ditches). The writer was always under the impression that

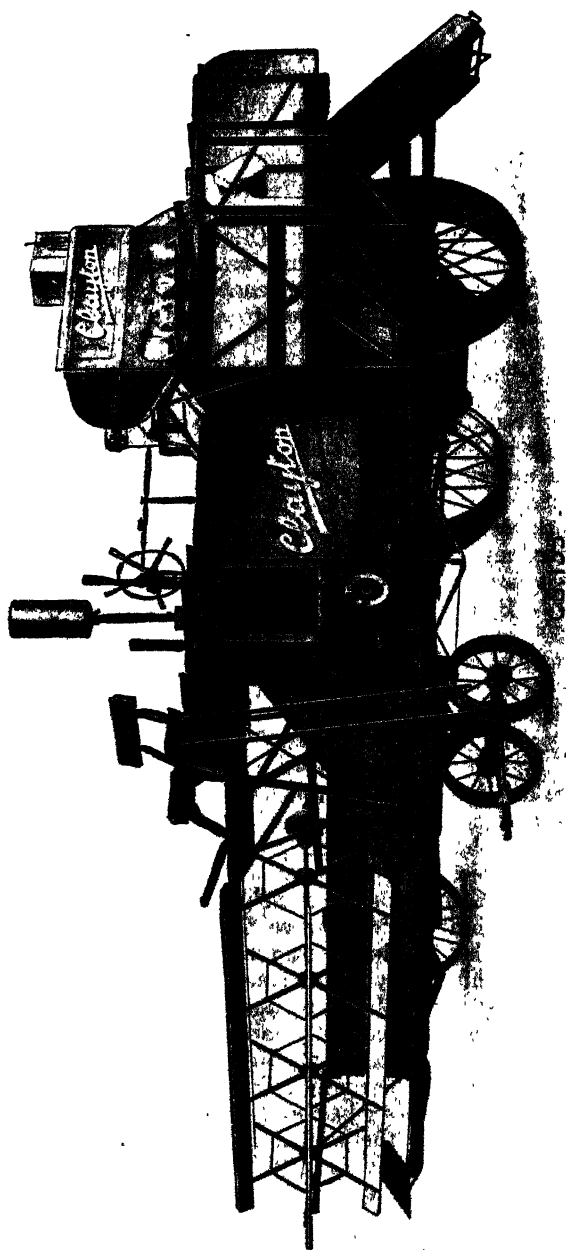


FIG. 4.—The Clayton Harvester-Thresher.

this would be a much more difficult task than it actually turned out to be in the trials. The machine operated most satisfactorily and the grease-gun method of lubrication adopted greatly facilitated the work. There were no breakages or stoppages at any time. All grain which fell in filling the bags dropped through a slotted floor into a chamber, from which it could be emptied at any time. Several filled sacks could be kept on the machine until it reached a convenient spot for dropping them to be collected by a cart. A subsequent examination of the field showed that very little grain had been lost in this trial. On the basis of an allowance of 8s. per acre for depreciation with 10 years to wipe out the capital cost, with, say, 20 working days per annum, the machine becomes an excellent investment, and this of course makes no allowance for the great saving which will be effected by the use of such a machine at harvesting-time in seasons of bad weather. The machine which the writer saw in operation harvested a crop of wheat $11\frac{1}{2}$ acres in extent in 5 working hours, or 2.3 acres per hour; 6 sacks of grain of 12 stone were filled in 20 minutes—a rate of 37 cwt. per hour. 25 to 30 acres per day is about the limit for economical working.

The general advantages of this type of machine may be summarised as follows:

(1) Stooking in the fields is eliminated. This has the advantage—

- (a) that it saves the labour of stooking;
- (b) it saves the damage due to bad weather, sprouting, etc;
- (c) it avoids damage by birds and vermin;
- (d) it leaves the field clear for ploughing;
- (e) it saves a certain spillage of grain.

(2) It saves binder twine.

(3) It economises transport and labour.

(4) It saves the loss of grain that occurs between the harvesting machine and the stook, the stook and the rick, the rick and the thrasher.

(5) At most, about three men are required for the complete process from cutting to threshing.

(6) These machines will harvest a variety of crops under varying conditions, ranging from an extremely short crop in a dry year to heavy, tangled and down grain in other seasons. In the case of an exceptionally weedy crop, which also contains too much moisture, it can be windrowed in one operation, and then when it is dried out a little, it can be harvested and threshed. Even this method saves some grain which would otherwise be spilled.

(7) These machines can be operated in England even when it has rained at night, as experience shows that a standing crop

dries very quickly. A delay of an hour or so longer should, however, be made as compared with the state of fitness for cutting by an ordinary harvesting machine. This, however, means that the combined machine can start work very soon after midday, and with its far greater speed of operation it can soon make up the time lost waiting for drying. In a season with constant rain it will probably be necessary to dry the grain after threshing. From the first to the third week in September it rained for 15 out of 18 days and the grain cut during this time had to be dried immediately after cutting, though on occasion the combine dealt with grain containing 22-24 per cent. of moisture.

Evidently the following points will require attention under English conditions :

(a) The hauling tractor must be so geared as to run consistently for longer periods at low speeds ; in fact, lower than is the custom in hotter countries.

(b) Some forethought should be given by the farmer so that all his grain shall not mature at one time, but rather it should be planted so that a few days may elapse between the ripening of different fields. This will give time to harvest one field without risk of loss in another.

(c) Each user of such a machine should provide himself with a simple moisture-testing apparatus, as then the trouble caused by wet grain could be prevented by delaying cutting until the moisture content was not more than 18 per cent.

(d) It is evident that there should not be any hurry to cut the grain, as if allowed to stand as long as possible before cutting, it will generally be of better quality because it is fully matured as well as easier to thresh properly.

(e) The question of the straw is one that is frequently raised. However, nowadays straw is becoming of as little value in this country as in others. The Clayton & Shuttlesworth machine, with its beater drum, delivers the straw in a fairly good state, though not quite as perfectly as from the ordinary type of large English thresher. As the straw is delivered on to the field in windrows it is easy to permit it to lie until it is sufficiently dry and then pick it up, with a mechanical loader, on to a cart. Alternatively a straw trusser can be attached. The demand for unbroken straw for thatching purposes is so small in this country now as not to be worth consideration. In fact, it would be better to adopt the continental practice of baling so as to offer a product that would compete with the baled straw, of which so much to-day is imported into this country.

(f) As a precaution, though not always needed, a grain drier and a winnowing machine should be provided as a standby where a combined machine is employed.

General Details.—As a result of the further trials carried out last season the model entered this year has undergone certain minor modifications from the one shown last year. It is supplied with either a 12 or 16-ft. cut and will harvest, thresh, clean and bag grain in one operation. It can also be fitted with a straw-trusser. It can be hauled by a tractor or horses, though the machine itself is operated by an independent 39-horse-power petrol engine which is a much more satisfactory method than the use of a drive from a tractor, as the speed can be definitely regulated. The header which is now built as a separate unit is of the balanced weight, articulated type and can easily be detached from the thrashing unit for transport purposes. All the controls on the machine have been centralised on an enlarged control platform. The tailings conveyor has now been transferred from the first dresser to the second dresser. The travelling wheels have also very wisely been enlarged to 5 ft. diameter and strengthened.

The construction is all metal; the threshing drum is 22 in. in diameter by 33 in. wide, and is fitted with eight ribbed beaters secured to heavy beater-bars mounted on three strong malleable iron centres, being thus in accord with English practice. Ball bearings are fitted throughout. The shaker crank-bearings can be lubricated by the operator from the ground at the rear of the machine without having to climb inside the machine. This is a marked improvement on foreign machines of this class. In certain details the machine can be still further improved, but, after all, there is no such thing as a perfect machine, since everything must be a compromise and a certain cost must not be exceeded.

While of course it is advantageous to operate these machines in large fields, they can be used in comparatively small ones—bearing in mind that the headlands required are a good deal wider than the normal.

Orders have been received for several hundreds of these machines, for use abroad, many of which have already been in use for some time, hence there is tried experience behind them.

After seeing this and other Harvester-Threshers in operation, there seems little doubt but that the doom of the ordinary threshing machine is sealed.

(b) *Bamford Oil Bath Mower* (Fig. 5). Considerable attention has been given during the past year or two to the lubrication of mowing machines. This is a two-horse-power mower with a 4-ft. 6-in. cut. The transmission gearing is in two stages, the second motion shaft carrying a spiral bevel crown wheel, which drives a pinion on the crankshaft. A disc on the crown wheel dips into a reservoir of oil at the bottom of the gear-case and causes a feed of oil to rise by centrifugal force to the gearing,

thrusters and clutch, &c., without churning or wasting it in any way. The oil raised in this way is distributed through the centre of the crankshaft itself to all parts of the machine. This is quite a new principle for lubricating mowers. The cutter bar has also been further improved. An attachment called "The Clear Way" is claimed so to hold out the material that the knife is able to make a clear cut at the edge of the swath, particularly in matted crops, thus replacing the ordinary parting board. It however requires to be properly adjusted or set. A further improvement is a spring engaging ball and socket joint

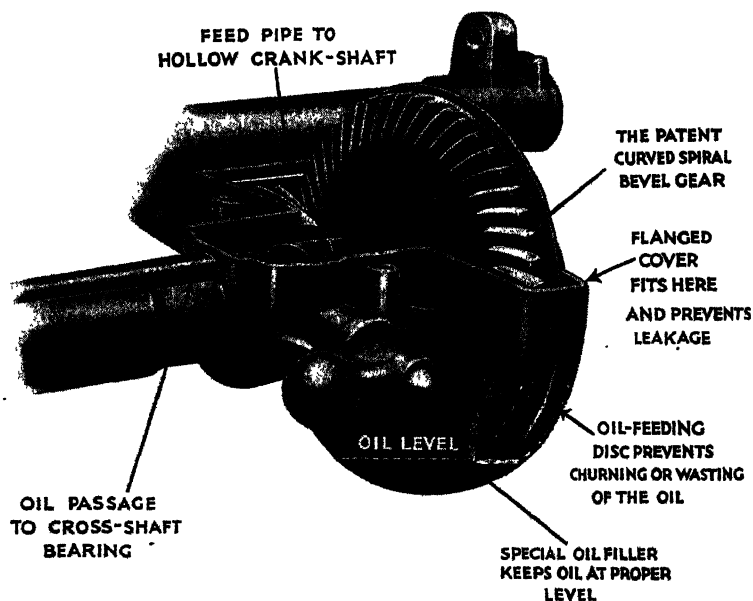


FIG. 5.—The Bamford Oil-Bath Mower.

on the pitman. The new type of cutter bar is certainly an improvement when cutting a heavy tangled crop. The automatic oiling arrangements were found very satisfactory under test, about half a pint of oil being consumed when cutting 16 acres of a heavy crop of vetches and oats and a medium crop of hop clover and rye-grass for a total period of about 27 hours. The machine, owing to improved lubrication, was unusually light in draft. It is interesting to note that oil-baths are not new, for this firm exhibited an oil-bath mower at the previous Warwick Show some forty years ago; however, the gearing of to-day is greatly improved in design.

(c) *The Albion Mowing Machine.* (Fig. 6.) This is a two-horse mower with a 4-ft. 6-in. cut and a vertical lift cutter bar. Lubrication is by means of a chain-driven gear pump situated in a sump underneath the gear-case. The pump feeds oil to the main bearings of the machine and is returned by gravity to the pump; oil to the crank-pin is fed through a duct in the crankshaft and crank-wheel. This forced lubrication by means of a pump is quite a new departure in mowing machines. The finger bar of the machine is also most ingeniously fitted with renewable hardened steel liners—a very practical and advantageous feature. The fingers, together with separate plates, are fastened to the finger bar with one bolt. Another advance on

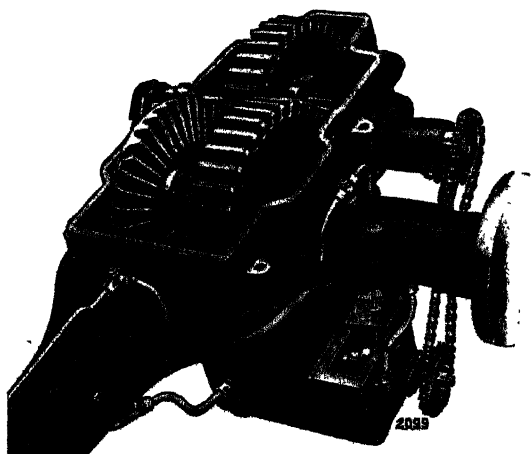


FIG. 6.—The Albion Oil-Bath Mowing Machine.

previous models is the vertical lift. The lifting lever is coupled to the bar by a ball crank lever which works in conjunction with an adjustable link. This lever is also connected to the in-and-out gear rod by a connecting link and pair of cams, which automatically throw the knife out of gear when the bar is raised slightly higher than the foot lift. When under test the lubricating oil consumption of this machine was unduly high. This, however, has now been corrected by the introduction of felt washers at the ends of the axles, as is the practice in many modern machines. While the machine generally was satisfactory in working, it was apparently slightly heavy in draught. It is a considerable advance in lubrication practice to employ oil instead of grease.

Class III. Barnyard Machinery.

The General Electric Company Portable Agricultural Drumotor. (Fig. 7.) This is a new departure in the design of agricultural motors. The "Drumotor" consists of a simple, robust, electric motor and starter which are housed in a steel drum, so that the whole can easily be rolled anywhere to its work. The armature shaft protrudes from one end and carries a two-speed pulley. Collapsible feet are incorporated for holding the motor in position when driving a machine. A 60-ft. length of cable for connecting the motor to the electricity supply is coiled round the drum when not in use, a recess being provided for the plug connection.

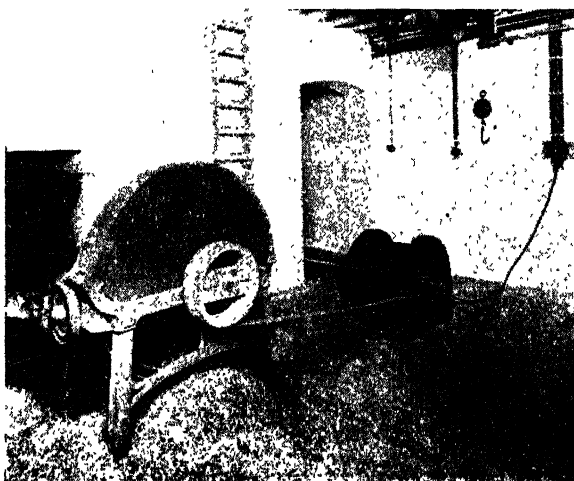


FIG. 7.—The Portable Agricultural "Drumotor."

The motor is of the simple squirrel cage, induction type, fitted with ball and roller bearings, *i.e.* it has only one moving part running on a pair of bearings. It would be difficult to imagine a simpler machine. The motor has been specially designed for the severe conditions in which it will have to work on the farm. The starter incorporated with it is of the simple push-button type, incorporating an air-break, iron-clad 3-pole contactor circuit breaker with no-volt and three over-load trips. The motor is extremely simple to operate, only requiring the pressure of a button either to start or stop it. The motor is rated at 5 h.p., 400/440 volts, 3 phase, 50 cycles, running at 960 r.p.m.

One of the features of this motor is the simplicity with which it can be transported from place to place, even over rough

ground, owing to the large diameter of the discs upon which it rolls. At the Test it was found that one man could roll the motor into position and line up the belt without difficulty. Further advantages of this piece of machinery are that it can be turned in its own length, no gearing or countershafting is necessary, two speeds are available and the only moving part is the pulley spindle of the motor itself. Grease plugs are fitted in special housings in the motor which retain the grease indefinitely, hence it rarely requires lubricating. It is certainly the most portable type of motor on the market and further has the advantage that there are no loose parts.

GENERAL REMARKS.

While it may be a little invidious to make any comment, the occasion justifies the statement that of the entries for the Silver Medal this year, the Harvester-Thresher and the Portable Electric Motor are obviously important landmarks in the future trend of agricultural machinery.

A pleasing feature of the entries this year was that due attention had been given to the suggestion made in this report last year, as to the all-importance of easy and effective lubrication. This was particularly noteworthy in the case of both the mower entries and that of the portable electric motor.

Again, as was the case last year, the entries were generally of a very high standard, since obviously the very high standard of practical performance needed nowadays to merit one of the Society's Silver Medals means the elimination of any machines that are not likely to survive a systematic technical investigation. More severe conditions of practical test mean that the Judges have to have the assistance of adequate testing arrangements. In this connection, they wish to record their special appreciation of the help given to them by the Society's Consulting Engineer, particularly for the carefully prepared and detailed report that was provided to cover the preliminary examination and tests that had been made. Without this assistance and without actual inspections of the machines operating under practical conditions, the Judges are certain they could not have so easily acquired the necessary data which are so essential to effective judging from the point of view of the practical farmer.

R. BORLASE MATTHEWS.

Greater Falcourt,
East Grinstead.

192524

REPORT OF THE STEWARD OF DAIRYING, WARWICK SHOW, 1931.

MILK YIELD TRIALS.

CATTLE, CLASSES 209 TO 219.

No alteration of any kind was made in the regulation or conduct of the trials at Warwick, except that as announced a year ago the dials of the milk-weighing machines registered pounds only, and at each weighing a ticket of the yield of milk was handed to each milker, in order to prevent any possible error or cause of complaint. Once again, twice-milking or thrice-milking was optional, but by far the greater number of competitors milked thrice in the twenty-four hours' test, the numbers being 42 as against 22 twice-milkers.

One hundred and fourteen entries had been received, but only 64 actually competed, the smallest number since 1907; keener competition with bigger yields, and depressed times, no doubt being responsible for the falling off in numbers.

Champion prizes were generously provided as heretofore by a Society keenly interested in the increased production of milk, and these were awarded as follows:—

CLASS A, for the larger breeds, Dairy Shorthorn, Lincolnshire Red Shorthorn, British Friesian, Red Poll and Blue Albion.—Champion Prize of £30 to Mr. E. G. Barton's British Friesian Cow "Chaddesley Hedge Rose 2nd." This wonderful cow, now 8 years old, was Royal Champion for the fourth time, her yield of 104 lb. being her best to date, though her butter-fat percentage of 3.66 was nearly 1 per cent. lower than last year, her live weight being 42 lb. less than at Manchester, viz. 12 cwt. 3 qr. 21 lb. The Reserve Prize of £5 went to another animal from Mr. Barton's herd, the four-year-old British Friesian cow "Saundby Patricia," with the fine yield of 94 lb. of 3.38 per cent. butter-fat.

CLASS B, for the Ayrshire, Guernsey and Jersey breeds.—Here the Champion Prize of £20 was won by a Jersey, Mr. E. A. Strauss's "Blush," a twice-milker with a yield of 55 lb. 8 oz. of 5.05 per cent. butter-fat. This cow also won the Special Prize of Ten Guineas given by the Royal Jersey Agricultural Society. Her live weight was 8 cwt. 2 qr. 14 lb. The Reserve Prize of £5 in this section went to Mr. David Wallace's Ayrshire cow "Auchenbrain Mayflower 10th," with the yield of 66 lb. 4 oz. of 3.31 per cent. butter-fat.

TABLE I.—MILK YIELD CLASSES AT WARWICK, 1931.

No. in Class	Exhibitor	Name of Cow	Live- weight	Date of birth	Date of last calf	No. of days in milk	Date of last service	Milk Yield				Points		Awards and Remarks				
								Morn- ing	Noon	Even- ing	Total	Aver- age Fat cont. × 4	Lacta- tion Total					
			Lb.		1931		1931	Lb.	oz.	Lb.	oz.	Lb.	oz.					
Class 209																		
1055	E. Uwins Gillette J. S. Taylor	Dairy Shorthorn, Twice Milked.	1414	May 2, 1924	June 14	24	—	18	0	14	0	49	0	49-00	16-64	Third Prize		
		Copsemaid	1225	April 10, 1926	June 14	24	—	17	12	17	0	21	0	55	12	55-76	Second Prize	
		Pinkney Lillian	1225	April 10, 1926	June 14	24	—	17	12	17	0	21	0	55	12	55-76	Second Prize	
Class 209																		
1056	St. Wm. Hinkley Hart T. W. Montague Perkins Duke of Westminster Duke of Devon	Dairy Shorthorn, Twice Milked.	1223	June 27, 1926	May 29	40	—	26	4	—	—	28	7	47-50	11-48	First Prize		
		Deborah Rose	1470	June 27, 1926	June 8	35	—	20	12	—	—	—	8	3-40	47-50	Second Prize		
		Kolman Daisy, 2nd	1470	June 27, 1926	June 8	35	—	20	12	—	—	—	8	3-40	47-50	Second Prize		
1057		Duke of Westminster Duke of Devon	Dairy Shorthorn, Twice Milked.	1106	July 2, 1927	June 1	37	—	24	0	—	—	28	8	46-50	12-08	First Prize	
	Camerton Dairy Maid 2nd		1106	July 2, 1927	June 1	37	—	24	0	—	—	—	8	3-27	46-50	First Prize		
	Camerton Dairy Maid 2nd		1106	July 2, 1927	June 1	37	—	24	0	—	—	—	8	3-27	46-50	First Prize		
Class 210																		
1131	B. G. Bowyer	Southdown Red Shorthorn, Twice Milked.	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
		Southdown Agnes 9th	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
1132		John Evans & Son	Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize	
	Southdown Recorder		1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
	Southdown Recorder		1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
1133	Ressell Wood		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize	
		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
1134		John Evans & Son	Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize	
	Southdown Recorder		1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
	Southdown Recorder		1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
1143	John Evans & Son Frank Salisbury		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize	
		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
		Southdown Recorder	1564	Jan. 31, 1925	May 1	48	—	27	0	20	4	23	8	69-76	11-64	First Prize		
Class 211																		
1211	John George Gray	Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
		Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
		Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
1212		Capt. R. S. Hall	Twohals Sunshine 5th	1244	July 16, 1925	Dec. 10	201	Jan. 24	13	0	10	8	11	12	33	4	32-25	12-36	Insufficient points
	Twohals Sunshine 5th		1244	July 16, 1925	Dec. 10	201	Jan. 24	13	0	10	8	11	12	33	4	32-25	12-36	Insufficient points
	Twohals Sunshine 5th		1244	July 16, 1925	Dec. 10	201	Jan. 24	13	0	10	8	11	12	33	4	32-25	12-36	Insufficient points
1213	Capt. Alan Richardson		Seven Springs Quinsie	1400	Oct. 13, 1923	Mar. 28	102	June 5	27	0	20	0	22	4	69	4	69-25	13-40	First Prize
		Seven Springs Quinsie	1400	Oct. 13, 1923	Mar. 28	102	June 5	27	0	20	0	22	4	69	4	69-25	13-40	First Prize
		Seven Springs Quinsie	1400	Oct. 13, 1923	Mar. 28	102	June 5	27	0	20	0	22	4	69	4	69-25	13-40	First Prize
1214		J. A. Oak, Sir Mark R.	Manor Roundell	1263	May 22, 1921	May 10	59	June 11	25	4	19	8	21	22	66	8	66-50	16-73	Third Prize
	Manor Roundell		1263	May 22, 1921	May 10	59	June 11	25	4	19	8	21	22	66	8	66-50	16-73	Third Prize
	Manor Roundell		1263	May 22, 1921	May 10	59	June 11	25	4	19	8	21	22	66	8	66-50	16-73	Third Prize
1215	Burrell, Bart, C.B.E.		Kesop Providence 7th	1281	May 6, 1926	May 13	56	—	28	13	20	12	23	4	70	12	70-76	12-46	Second Prize
		Kesop Providence 7th	1281	May 6, 1926	May 13	56	—	28	13	20	12	23	4	70	12	70-76	12-46	Second Prize
		Kesop Providence 7th	1281	May 6, 1926	May 13	56	—	28	13	20	12	23	4	70	12	70-76	12-46	Second Prize
1216		Mrs. M. M. Fitzgerald	Marden Minnie	1547	July 4, 1926	Feb. 21	187	—	18	13	14	4	16	0	49	0	49-00	15-63	Fifth Prize
	Marden Minnie		1547	July 4, 1926	Feb. 21	187	—	18	13	14	4	16	0	49	0	49-00	15-63	Fifth Prize
	Marden Minnie		1547	July 4, 1926	Feb. 21	187	—	18	13	14	4	16	0	49	0	49-00	15-63	Fifth Prize
1217	John George Gray		Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
		Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
		Red Poll, Twice Milked.	1295	Nov. 30, 1925	May 9	60	—	13	4	11	8	13	0	37	12	37-76	2-00	Insufficient points
1218		Capt. Sir H. E. de Trafford, 2nd Bt.	Grimsburgh Wanderer	1272	July 4, 1926	May 14	55	—	25	4	—	—	17	12	43	0	43-00	11-40	First Prize
	Grimsburgh Wanderer		1272	July 4, 1926	May 14	55	—	25	4	—	—	17	12	43	0	43-00	11-40	First Prize
	Grimsburgh Wanderer		1272	July 4, 1926	May 14	55	—	25	4	—	—	17	12	43	0	43-00	11-40	First Prize
1219	Lord Cranworth		Grimsburgh Wanderer	1272	July 4, 1926	May 14	55	—	30	4	—	—	27	0	57	4	57-25	14-40	Fourth Prize
		Grimsburgh Wanderer	1272	July 4, 1926	May 14	55	—	30	4	—	—	27	0	57	4	57-25	14-40	Fourth Prize
		Grimsburgh Wanderer	1272	July 4, 1926	May 14	55	—	30	4	—	—	27	0	57	4	57-25	14-40	Fourth Prize

TABLE I.—MILK YIELD CLASSES AT WARWICK, 1931 (continued).

No. in Cate- gory	Exhibitor	Name of Cow	Live- weight	Date of birth	Date of last calf	No. of lugs at milk	Date of last service	Milk Yield				Aver- age per cent- age	Points		Awards and Remarks
								Morn- ing	Noon	Even- ing	Total		Aver- age per cent- age x 4	Total	
			Lb.		1931		1931	Lb. oz.	Lb. oz.	Lb. oz.	Lb. oz.				
Class 218															
1363	T. Dobson . . .	Rose Albion, Thrice Milked.	1323	Sept., 1926	Feb. 3	165	May 2	17 12	14 12	15 0	47 8	2.20	47.50	11.50	Fat below Standard
1364	T. Dobson . . .	Remond of Ridgewood . . .	1120	Jan., 1926	June 8	30	—	18 8	14 12	15 8	49 12	2.26	49.75	10.40	Third Prize
1365	T. Dobson . . .	Rose of Ridgewood . . .	1389	Sept. 23, 1923	June 23	16	—	21 0	15 0	17 4	53 4	2.71	53.25	14.60	First Prize
Class 219															
1366	W. R. Glover . . .	Rose Albion, Twice Milked.	1693	Nov. 23, 1923	June 23	18	—	25 4	—	23 4	47 8	6.00	47.50	20.00	Second Prize
1369	Capt. Stanley Smith . . .	Pike Daisy . . .	1120	Unknown	May 13	56	—	24 8	—	24 4	48 12	3.27	48.75	13.05	Reserve Number
Class 214															
1369	R. G. Barton . . .	British Friedland, Thrice Milked.	1449	April 16, 1923	June 19	19	—	27 8	22 0	24 8	104 00	3.66	104.00	14.66	First Prize and Champion, Section A
1361	Capt. John Christie, M.C.	Glyndebourne Hedge Rose 2nd	1540	July 27, 1924	May 19	51	—	20 8	14 0	18 8	53 0	3.46	53.00	13.98	Fifth Prize
1362	Capt. John Christie, M.C.	Glyndebourne Torch 5th	1664	Nov. 20, 1924	May 21	48	—	27 12	28 0	24 0	74 12	2.81	74.75	11.26	Fat below Standard
1364	T. R. Gladstone . . .	Royds Glosie . . .	1443	July 3, 1923	May 1	68	—	24 0	20 12	21 14	65 0	3.48	66.00	13.03	Third Prize
1369	Miss M. Martin Smith . . .	Duchess Peggy . . .	1316	Nov. 20, 1920	June 5	33	—	24 8	21 4	23 0	68 12	3.21	68.75	13.66	Fourth Prize
1371	R. G. Barton . . .	Handy, Patricia . . .	1169	May 11, 1927	June 2	36	—	27 4	26 8	23 0	94 0	3.88	94.00	13.63	Second Prize and Reserve Champion, Section A
1376	T. R. Gladstone . . .	Dignit Fable . . .	1638	June 1, 1926	May 19	51	—	21 4	17 8	18 4	57 0	2.73	57.00	10.33	Fat below Standard
Class 215															
1447	H. J. Clark . . .	Ayrshire, Thrice Milked.	1309	Nov. 28, 1923	June 23	16	—	23 0	17 4	20 4	60 8	4.11	60.50	16.46	Second Prize
1462	Adam W. Montgomerie . . .	Older Maggie . . .	1288	Feb. 23, 1925	June 17	21	—	20 4	17 8	18 8	56 4	3.25	56.25	13.00	Third Prize
1467	Clément E. Tery . . .	Pickens Nannie . . .	1008	Oct. 16, 1926	June 17	21	—	18 4	15 8	17 8	51 4	4.40	51.50	17.60	Fourth Prize
1469	David Wallace . . .	Mention Lucy . . .	1078	Oct. 20, 1925	June 19	19	—	24 4	20 4	21 12	66 4	3.81	66.25	13.26	First Prize and Reserve Champion, Section B
Class 216															
1692	Harold James Fithrow . . .	Guernsey, Thrice Milked.	1141	Dec. 11, 1924	Feb. 6	192	April 21	17 8	12 4	15 4	45 0	4.63	45.00	18.53	First Prize
1697	J. H. Vincent Collage . . .	Engew Gentle 4th . . .	1064	Feb. 2, 1927	June 9	59	—	17 12	13 0	16 8	46 4	3.85	46.25	13.40	Third Prize
Class 216															
1361	She Gordon Ley, Bart.	Guernsey, Thrice Milked.	1190	Oct. 5, 1925	May 24	45	—	26 12	—	22 8	49 4	3.4	49.25	13.60	Second Prize

Class 217. 1867	Mrs. Evelyn	Jenny, Twice Milked.	Mar. 29	101	—	14	0	11	12	11	8	37	4	5-31	37-25	21-26	5-00	68-51	Highly Commended
1868	Mrs. Evelyn	Fancy Balm.	May 2	67	—	20	8	17	4	17	4	55	0	4-30	55-00	17-20	2-70	74-90	Second Prize and Reserve for R.A.S. Special Prize
1869		Wotton Moonlit Bands																	
1870	St. John R. Lloyd	Wanda's Mistress	May 5	64	—	13	4	12	0	14	12	40	0	4-73	40-00	18-63	61-33	Highly Commended	
1871	St. Harold Montebello	Wanda's Mistress	May 15	66	—	11	10	12	0	10	12	40	0	4-73	40-00	18-63	61-33	Highly Commended	
1872	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1873	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1874	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1875	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1876	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1877	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1878	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1879	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1880	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1881	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1882	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1883	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1884	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1885	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1886	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1887	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1888	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1889	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1890	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1891	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1892	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1893	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1894	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1895	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1896	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1897	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1898	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1899	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1900	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1901	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1902	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1903	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1904	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1905	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1906	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1907	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1908	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1909	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1910	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1911	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1912	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1913	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1914	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1915	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1916	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1917	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1918	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1919	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1920	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1921	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1922	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1923	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1924	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1925	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1926	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1927	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1928	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1929	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1930	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1931	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1932	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1933	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1934	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1935	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1936	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1937	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1938	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1939	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1940	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1941	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	Highly Commended
1942	Lady Bryna Mossell	Wanda's Mistress	Apr. 15	80	—	13	4	12	8	13	8	44	4	4-23	44-25	15-63	4-40	63-56	High

CLASS C, for Kerries and Dexters.—The Champion Prize of £10 went to Miss P. de B. Bowen Colthurst's "Drumgaunagh Favourite 2nd," a seven-year-old Kerry which gave 44 lb. of milk in two milkings of 3.50 per cent. butter-fat, her live weight being 8 cwt. 1 qr. 14 lb. The Reserve Prize of £5 was awarded to Mr. Newton R. Steel's Kerry "Muckcross Moscow."

In the accompanying tables, Table I (pages 355-7) gives all records and awards, whilst in Table II comparisons are drawn as to the performances of the various breeds.

TABLE II.—Average Results obtained from Cows of the various Breeds entered in the Milk Yield Classes.

No. of Cows competing	Breed	Live Weight	Days in Milk	Yield of Milk	Fat per-centage	Total points
		Cwt. qr. lb.		Lb. oz.		
6	Dairy Shorthorn . . .	11 3 1	32	50 15	3.42	64.63
6	Lincoln Red . . .	13 1 14	62	65 7	3.44	81.08
9	Red Poll . . .	12 1 19	91	53 8	3.28	70.40
5	Blue Albion . . .	11 2 3	55	49 3	3.61	66.41
7	British Friesian . . .	13 0 7	44	73 15	3.25	87.76
4	Ayrshire . . .	10 1 23	19	58 9	3.77	73.64
3	Guernsey . . .	10 0 12	75	46 13	3.80	65.91
13	Jersey . . .	8 0 6	73	43 6	4.75	65.70
6	Kerry . . .	8 0 22	116	30 13	3.85	50.15
5	Dexter . . .	6 1 24	70	34 5	3.32	51.05

From the data obtained one or two interesting points have been ascertained. For instance, the yield of milk in proportion to the live weight in the three leading breeds is:—

British Friesian.	1 lb. of milk from 19 lb. live weight.
Ayrshire . . .	1 " " " 20 " " "
Dexter . . .	1 " " " 21 " " "

The average age of the cows varied somewhat in the different breeds, the Dairy Shorthorns being just over 5 years, the Lincoln Reds being 7 years old, the Red Polls 6½, the British Friesians 7, and the Ayrshire 5½ years.

The performances of two Jersey heifers call for comment, "Black Arts Post Girl" at 3 years 3 months old was giving 52 lb. of milk daily, having been calved 90 days, whilst "Excess Postage," also bred and owned by Mr. Grosvenor Berry, at only 2 years 4 months old, being then 11 weeks calved, was giving

36½ lb. of milk daily, containing 4.78 per cent. butter-fat; these heifers were respectively fourth and highly commended in the Jersey section.

Omitting comparisons of single cows, as being of little or no value, Table III shows the results as between the twice- and thrice-milked cows of the various breeds. These comparisons have now been made for five years, with the almost invariable result that the thrice-milkers give the greater yields of milk, and I consider no useful purpose will be served by continuing this table any longer; thrice milking for our heavy yielding cows has come to stay and is now a normal happening in most large milking herds.

TABLE III.—*Comparison of Average Results of Cows milked Twice and Thrice daily in the Milk Yield Classes.*

Breed	No. of Cows	Average Live Weight	Days in Milk	Milk Yield	Fat percentage	Points
		Cwt. qr. lb.		Lb. oz.		
<i>Dairy Shorthorn.</i>						
Thrice milked . .	2	11 3 4	24	52 6	3.61	66.81
Twice „ . .	4	11 3 0	35	50 4	3.32	63.54
<i>Red Poll.</i>						
Thrice Milked . .	7	12 1 21	95	54 7	3.30	71.54
Twice „ . .	2	12 1 11	74	50 2	3.22	66.41
<i>Blue Albion.</i>						
Thrice Milked . .	3	10 3 23	67	50 3	3.26	67.04
Twice „ . .	2	12 1 14	36	48 2	4.13	65.46
<i>Jersey.</i>						
Thrice milked . .	9	7 3 23	74	44 0	4.57	65.55
Twice „ . .	4	8 1 3	73	42 1	5.15	66.03

BUTTER TEST TRIALS.

CLASS 220 A AND B.

As in the Milk Yield Trials entries were very low, and of the 71 cows and heifers entered, only 38 competed, under precisely the same conditions as hitherto, the comparative results being shown in Tables IV and V.

TABLE IV.—RESULTS OF BUTTER TESTS AT WARWICK, 1931.

CLASS 220A.—COWS EXCEEDING 900 LB. LIVE WEIGHT.

No. in Catalogue	Exhibitor	Name of Cow	Live weight	Date of birth	Date of last calf	No. of days in milk	Date of last Berries	Milk yield in 24 hours	Butter yield	Ratio, viz. lb. milk to lb. butter	No. of pounds of milk for butter	No. of pounds of milk for lactation	Total No. of points	Awards and Remarks
1081	T. W. Montague Perkins	Dairy Shorthorns. Twice Milked. Holmsley Daisy 23rd	Lb. 1470	June 27, 1926	1931 June 3	35	1931 —	Lb. oz. 44 8	1 5½	33-11	21-50	NH	21-50	Ratio over 30
1086	Tutton & Deans	Camerton Dairy Maid 2nd	1106	July 2, 1927	June 1	37	—	46 8	1 3½	38-15	19-50	NH	19-50	Ratio over 30
1131	B. G. Bowser	Lincolnshire Red Shorthorns. Three Milked. Southern Agnes 9th	1554	Jan. 31, 1925	May 21	48	—	69 12	1 12	39-85	22-00	0-80	22-80	Ratio over 30
1132	John Evans & Son	Brookholme Recorder	1297	May 21, 1925	Mar. 18	112	—	49 0	2 5½	23-08	35-50	5-00	40-50	Fourth Prize
1138	Russell Wood	Bendish Charm 8th	1484	June 29, 1925	May 19	50	—	77 8	1 4½	60-48	20-50	1-00	21-50	Ratio over 30
1140	John Evans & Son	Burton Amy 14th	1694	June 22, 1926	May 3	68	—	37 12	1 2½	32-64	18-50	2-60	21-10	Ratio over 30
1141	John Evans & Son	Burton Jewess 5th	1463	Oct. 17, 1923	May 22	47	—	78 4	1 5½	38-23	21-50	0-70	22-20	Ratio over 30
1143	Frank Sainsbury	Southern Charm	1626	Aug. 14, 1922	May 19	50	—	80 8	2 10½	30-30	42-50	1-00	43-50	Ratio over 30
1211	John George Gray	Red Polls. Twice Milked. Polestead Profile	1295	Nov. 30, 1925	May 9	60	—	37 12	1 2	38-55	18-00	2-00	20-00	Ratio over 30
1212	Capt. R. S. Hall	Theobalds Sunshine 5th	1344	July 16, 1925	Dec. 19	201	Jan. 24	35 4	0 15	37-60	15-00	12-00	27-00	Ratio over 30
1216	Capt. Alan Richardson	Seven Springs Quinine	1400	Oct. 12, 1923	Mar. 28	102	June 5	69 4	2 1½	33-07	33-50	6-20	39-70	Ratio over 30
1218	Lt.-Col. Sir Merrick R. Burrell, Bart., C.B.E.	Knapp Prudence 7th	1281	May 9, 1926	May 13	56	—	70 12	1 16½	35-93	31-50	1-60	33-10	Ratio over 30
1227	Mrs. M. M. FitzGerald	Marsden Minulus	1347	July 4, 1926	Feb. 21	137	—	49 0	1 11	29-03	27-00	2-00	29-00	—
1229	John George Gray	Basilton Royal Rosie 5th	1651	Feb. 12, 1926	May 16	53	—	52 12	1 5½	39-26	21-50	1-30	22-80	Ratio over 30
1360	E. G. Barton	British Friesians. Thrice Milked. Chaddesley Hedge Rose 2nd	1449	April 16, 1923	June 19	19	—	104 0	3 6½	30-33	54-50	NH	54-50	Ratio over 30
1361	Capt. John Christie, M.C.	Glyndebourne Rik Lettice.	1540	July 27, 1924	May 18	51	—	53 0	1 15	27-36	51-00	1-10	32-10	—
1362	Capt. John Christie, M.C.	Glyndebourne Torch 5th	1684	Nov. 20, 1924	May 21	48	—	74 12	1 15½	37-96	31-50	0-80	32-30	Ratio over 30
1371	E. G. Barton	Saundby Patricia	1160	May 11, 1927	June 2	36	—	94 0	2 14½	32-34	46-50	NH	46-50	Ratio over 30

1447	H. J. Clark . . .	Avadhites. Thrice Milked.	1309	Nov. 29, 1926	June 22	16	—	60	8	2	4	28-38	36-00	NH	36-00	Highly Commended
1462	Adam W. Mont- gomery	Older Maggie . . .	1288	Feb. 22, 1925	June 17	21	—	56	4	1	11½	32-72	27-50	NH	27-50	Ratio over 30
1467	Clement E. Tery	Pickens Nannie . . .	1008	Oct. 16, 1926	June 17	21	—	51	4	2	11½	24-47	33-50	NH	33-50	—
1469	David Wallace . .	Auchenbrahn Mayflower 10th	1078	Oct. 20, 1925	June 19	19	—	66	4	1	10½	40-00	26-50	NH	26-50	Ratio over 30
1527	J. H. Vincent Collings	Gurnseys. Thrice Milked. Princess 3rd of Cotes aux Monts	1064	Feb. 2, 1927	June 9	29	—	46	4	1	3	38-94	19-00	NH	19-00	Ratio over 30
1524	R. M. Thorneley .	Gurnsey. Twice Milked. Batchwood Venus 2nd	980	Aug. 10, 1922	May 7	62	—	41	12	1	5½	31-06	21-50	2-20	23-70	Ratio over 30
1590	Mrs. Evelyn . .	Jerseys. Thrice Milked. Wotton Moonlit Sands	938	June 19, 1925	May 2	67	—	55	0	2	8½	21-72	40-50	2-70	43-20	Third Prize and E. J. C. S. Bronze Medal
1603	Sir John B. Lloyd .	Hamletta's Mistress . .	959	Mar. 24, 1927	May 5	64	—	40	0	2	1½	19-10	33-50	2-40	35-90	Commended, and E. J. C. S. Cop- perts of Merit
1609	Lady Eyles Monsell, C.B.E.	Dumbleton Duchess 5th .	966	Nov. 5, 1925	April 29	70	—	46	8	1	10	28-61	26-00	3-00	29-00	Below Standard
1611	H. Cecil Pelly . .	Flashlight's Josy . . .	910	Feb. 24, 1925	May 4	65	—	54	0	2	4	24-00	36-00	2-50	38-50	Fifth Prize
1610	H. S. Mountain . .	Jerseys. Twice Milked. Cantestwell's Berthe . .	1036	July 22, 1925	Feb. 14	144	May 15	34	4	1	10	21-07	26-00	10-40	36-40	Reserve Number and E. J. C. S. Cer- tificate of Merit
1613	Mrs. C. J. Phillips .	Dalby O.K.	966	April 7, 1927	April 25	74	July 1	40	0	2	8	19-60	40-00	3-40	43-40	Second Prize and E. J. C. S. Silver Medal
1615	W. Humphrys Prescott	Groombridge Sweetbread .	945	April 4, 1926	May 31	38	—	23	4	1	0	23-25	16-00	NH	16-00	Below Standard
1620	E. A. Strauss . . .	Blush	966	Jan. 25, 1927	Mar. 15	115	June 7	55	8	3	0½	18-90	48-50	7-50	56-00	First Prize and E. J. C. S. Gold Medal
2202.—COWS NOT EXCEEDING 900 LB. LIVE WEIGHT.																
1597	Mrs. Evelyn . . .	Jerseys. Thrice Milked.	854	July 17, 1926	Mar. 29	101	—	37	4	2	0½	18-93	32-50	5-00	37-50	First Prize
1605	Sir Harold Mackin- tosh	Fancy Edna	826	Dec. 24, 1927	May 19	50	—	30	4	2	0½	14-80	32-50	1-00	33-50	Highly Commended and E. J. C. S. Cer- tificate of Merit
1608	Lady Eyles Monsell, C.B.E.	Accordian 3rd	892	Aug. 6, 1926	April 15	81	—	44	4	2	0½	21-78	32-50	4-40	36-90	Second Prize
1627	Grosvenor Berry . .	Black Art's Post Girl . .	868	Mar. 20, 1928	April 9	90	June 27	52	0	1	15	26-63	31-00	5-00	36-00	Third Prize
1639	Grosvenor Berry . .	Excels Postage	819	Mar. 6, 1929	April 25	71	—	36	12	1	14½	19-27	30-50	3-40	33-90	Reserve Number and E. J. C. S. Cer- tificate of Merit
1719	Mrs. T. H. Peyton .	Dartons. Twice Milked. Gaynor Gay	672	Mar. 14, 1925	May 11	58	—	35	12	1	3	30-10	19-00	1-80	20-80	Ratio over 30

TABLE V.—Average Results of Cows entered in the Butter Tests.

CLASS 220A.—COWS EXCEEDING 900 LB. LIVE WEIGHT.

Breed	Live Weight	Days in Milk	Yield of Milk	Yield of Butter	Butter Ratio in lb.	Points
	Cwt. qr. lb.		Lb. oz.	Lb. oz.		
Dairy Shorthorn . . .	11 2 0	36	45 8	1 4 $\frac{1}{2}$	35·51	20·50
Lincoln Red . . .	13 1 23	62	65 7 $\frac{1}{2}$	1 12	37·74	29·60
Red Poll . . .	12 3 0	101	52 7 $\frac{1}{2}$	1 8 $\frac{1}{2}$	34·37	28·60
British Friesian . . .	13 0 4	38	54 4 $\frac{3}{4}$	1 11 $\frac{1}{4}$	31·87	41·35
Ayrshire . . .	10 1 23	19	58 9	1 15	30·10	30·87
Guernsey . . .	9 0 14	46	44 0	1 4 $\frac{1}{2}$	34·76	21·35
Jersey . . .	8 2 9	80	44 11	2 1 $\frac{1}{2}$	21·46	37·30

CLASS 220B.—COWS NOT EXCEEDING 900 LB. LIVE WEIGHT.

Jersey	7 2 10	133	40 2	2 0	20·06	35·56
Dexter	6 0 0	58	35 12	1 3	30·10	20·80

On this occasion the honours went to the Jerseys; indeed they were the only breed in which, averages being taken, the butter ratio did not exceed 1 in 30, that is 30 lb. of milk producing one pound of butter, the minimum limit laid down in these tests.

Of the five prizes in the heavyweight class (over 900 lb. live weight) four went to Jerseys, the first going to Mr. E. A. Strauss's "Blush," which cow also won the English Jersey Cattle Society's Gold Medal. This was the only cow with the exception of "Chad-desley Hedge Rose 2nd" to produce 3 lb. of butter.

The butter ratios varied from 1 lb. from 60 $\frac{1}{2}$ lb. of milk in the case of a Lincoln Red, to 1 lb. from 14·9 lb. of milk in the case of a Jersey.

In the light weight class the Jerseys won all the three prizes awarded.

Only 8 of the cows in the Butter Test were twice-milkers, and it is only in the case of the Jerseys that any comparison can be drawn, their averages being:—

	No. of Cows	Live Weight	Days in Milk	Yield of Milk	Yield of Butter	Butter Ratio	Points
		Cwt. qr. lb.		Lb. oz.	Lb. oz.		
<i>Jersey.</i>							
Twice milked . .	4	8 2 26	93	40 8	2 0 $\frac{1}{2}$	19·08	37·95
Thrice „ . .	9	7 3 23	74	44	2 0 $\frac{3}{4}$	21·55	36·04

No.	Exhibitor	Name of goat	Breed	Date of birth	Date of last kid	No. of kids	Milk Yield			Percentage of Solids not Fat				Points			Awards and Remarks		
							Morn.	Even.	Lb. or gal.	Total	Morn.	Even.	Total	Morn.	Even.	Lactation		Production	Total
1737	Clara 230 (Quality)	Hargrave Arques	British Toggenburg	May 18, 1929	May 8	61	4	11	10	8	8	8	8	8	10	8	8	8	H.C.
1738	Miss Bruno Farver	Hargrave Salmom	British Toggenburg	May 18, 1929	May 17	87	4	11	10	8	8	8	8	8	10	8	8	8	H.C.
1740	Miss Gladys Hall	Webb Livery	British Toggenburg	April 25, 1927	April 19	87	4	10	4	5	9	2	3	60	8	40	3	11	0
1741	Mrs. B. K. Morcom	Cornish Jubilee	British Toggenburg	Mar. 7, 1928	Dec. 23	108	5	0	4	9	4	5	4	5	9	4	5	4	H.C.
1742	Miss Pope	Layland Pearl	British Toggenburg	June 10, 1927	May 11	68	8	10	7	5	13	15	3	25	3	70	8	45	Second Prize and Purse Challenge Certificate
1744	J. R. Egerton	Malpas Meadowsweet	British Saanen	Feb. 15, 1929	Mar. 6	124	6	0	5	8	11	8	3	70	8	45	8	45	Second Prize and Purse Challenge Certificate
1745	J. R. Egerton	Bidgeway Robbabe	British Saanen	Feb. 25, 1929	Feb. 28	125	4	11	4	6	13	9	4	20	8	40	2	15	0
1746	J. R. Egerton	Whitney Waverly	British Saanen	Feb. 25, 1929	Apr. 17	125	8	1	6	12	13	14	14	20	8	40	2	15	0
1747	Mrs. R. K. Morcom	Dalgarra Delgada	British Saanen	Nov. 15, 1928	Feb. 7	151	3	15	3	13	9	11	8	70	8	45	8	45	H.C.
1748	Mrs. R. K. Morcom	Cornish Cassandra	British Saanen	Feb. 2, 1929	Mar. 15	124	5	11	4	4	9	15	3	70	8	45	8	45	H.C.
1749	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 2, 1929	Mar. 15	124	5	11	4	4	9	15	3	70	8	45	8	45	H.C.
1750	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	First Prize, Dual Purpose Challenge Certificate and Dewey Cup (with No. 1782).
1754	Miss Pope	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	H.C.
1755	Miss C. Chamberlain	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	H.C.
1756	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	H.C.
1759	Miss K. Kelly	Thydon Pauline	British Saanen	Feb. 6, 1928	Mar. 29	101	7	4	7	4	14	8	3	42	3	40	8	45	H.C.
1770	Miss Pope	Frank of Buehly	British Saanen	Jan. 8, 1928	June 23	157	7	4	6	2	13	13	4	10	3	70	8	45	H.C.
1772	Mrs. Roger Wethered	Dalgarra Delgada	British Saanen	Mar. 4, 1928	Mar. 4	128	5	12	5	2	10	14	2	27	8	40	8	45	H.C.
1789	Clara 321 (Quality)	Hargrave Salmom	British Toggenburg	May 18, 1929	April 12	87	8	0	7	7	6	0	17	7	0	17	7	0	H.C.
1790	Miss Bruno Farver	Webb Livery	British Toggenburg	April 25, 1927	April 19	88	4	10	4	6	4	10	13	12	0	13	12	0	H.C.
1791	Mrs. R. K. Morcom	Cornish Jubilee	British Toggenburg	Mar. 7, 1928	Dec. 23	108	5	0	4	4	4	12	14	0	0	12	14	0	H.C.
1792	Miss Pope	Layland Pearl	British Toggenburg	June 10, 1927	May 11	68	8	10	7	5	13	15	3	25	3	70	8	45	Second Prize Reserve
1793	J. R. Egerton	Malpas Meadowsweet	British Saanen	Feb. 15, 1929	Mar. 6	124	6	0	5	8	11	8	3	70	8	45	8	45	Second Prize Reserve
1794	J. R. Egerton	Bidgeway Robbabe	British Saanen	Feb. 25, 1929	Feb. 28	125	4	11	4	6	13	9	4	20	8	40	2	15	0
1795	J. R. Egerton	Whitney Waverly	British Saanen	Feb. 25, 1929	Apr. 17	125	8	1	6	12	13	14	14	20	8	40	2	15	0
1796	Mrs. R. K. Morcom	Dalgarra Delgada	British Saanen	Nov. 15, 1928	Feb. 7	151	3	15	3	13	9	11	8	70	8	45	8	45	Fourth Prize
1797	Mrs. R. K. Morcom	Cornish Cassandra	British Saanen	Feb. 2, 1929	Mar. 15	124	5	11	4	4	9	15	3	70	8	45	8	45	Fourth Prize
1798	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 2, 1929	Mar. 15	124	5	11	4	4	9	15	3	70	8	45	8	45	Fourth Prize
1799	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1800	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1801	Miss C. Chamberlain	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1802	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1803	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1804	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1805	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1806	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1807	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1808	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1809	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1810	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1811	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1812	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1813	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1814	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1815	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1816	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1817	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1818	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1819	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1820	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1821	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1822	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1823	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1824	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1825	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1826	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1827	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1828	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1829	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1830	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1831	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1832	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1833	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1834	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1835	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1836	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1837	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1838	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1839	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1840	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1841	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1842	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1843	Mrs. R. K. Morcom	Cornish Renown	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1844	Mrs. R. K. Morcom	Broxbourne Lady May	British Saanen	Mar. 2, 1927	Feb. 9	140	5	10	8	7	17	1	4	32	4	35	9	45	Fourth Prize
1845	Mrs. R. K. Morcom	Mosely Mandoline	British Saanen	Jan. 15, 1929	Mar. 7	128	5	12	5	2	10	14	2	27	8	40	8	45	Fourth Prize
1846	Mrs. R. K. Morcom	Whitney Waverly	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0	0	0	0	Fourth Prize
1847	Mrs. R. K. Morcom	Cornish Maiden	British Saanen	Feb. 15, 1929	Jan. 19	115	4	4	4	4	10	0	0	0	0				

MILK YIELD TRIALS.

(GOATS, CLASSES 230 AND 231.)

Thirty-six goats competed in the Trials, which were once again under the charge of Mr. T. W. Palmer of the British Goat Society.

Full details are given in Table VI. "Gallon goats," once great performers, are now the rule and not the exception; in fact, 5 goats gave over 2 gallons each in the 24 hours, the highest yield being 25 lb. 5 oz. This goat, a British Saanen, shown by Miss K. Pelly, had been more than 21 weeks in milk.

The fat percentages varied from 2.65 to 5.10, both samples being morning's milk; the solids not fat varied from 7.40 per cent. to 9 per cent., the latter being morning's milk.

WORKING DAIRY.

The usual demonstrations in butter yields, and butter and soft cheese making were given, so far as time and opportunity allowed, the greater part of the time being taken up by the various competitions, and on Friday by the churning of the Butter Test creams.

The Butter-making competitions are becoming almost too popular, if that is possible, having grown from 70 entrants at Harrogate to 189 at Warwick.

The first Inter-county Butter-making Championship took place on the Saturday morning, 8 teams having entered, but the Rutlandshire team was unfortunately absent owing to a bereavement.

In order that this event should include all classes of competitors and not merely champions, the teams each included not more than one Champion; a winner of not more than 3 first prizes; and a novice who had never won a first or second prize.

After an exceedingly close contest the Championship went to Lancashire, with Devon second and Cornwall third. The judge, in making his award, took into consideration team spirit in the way of the uniform making up of the butter, and in the competitors' dress, though by far the majority of the points awarded were for the actual butter-making, the "team spirit" points only weighing down the balance, other things being equal.

The individual championship went to a Cornish girl, working in Hampshire, with Devon second, and Cornwall third.

The Countess of Warwick very kindly presented the Awards in the County Championship, and Mrs. Burke, the wife of the

Honorary Director, gave away the Individual Championship Awards on Saturday evening.

It is difficult to say anything fresh about the staff of the Dairy. I am certain no department has a better staff, and no staff has to work so hard. The Milking Trial day means not "eight hours" but twice eight, and I can but thank one and all for their ungrudging efforts, especially Miss Noble, Mr. Gubbins, Mr. Hasted; Mr. H. R. Hammond for the Milk and Butter Tests; and Mr. J. R. Steel in the Poultry Tent.

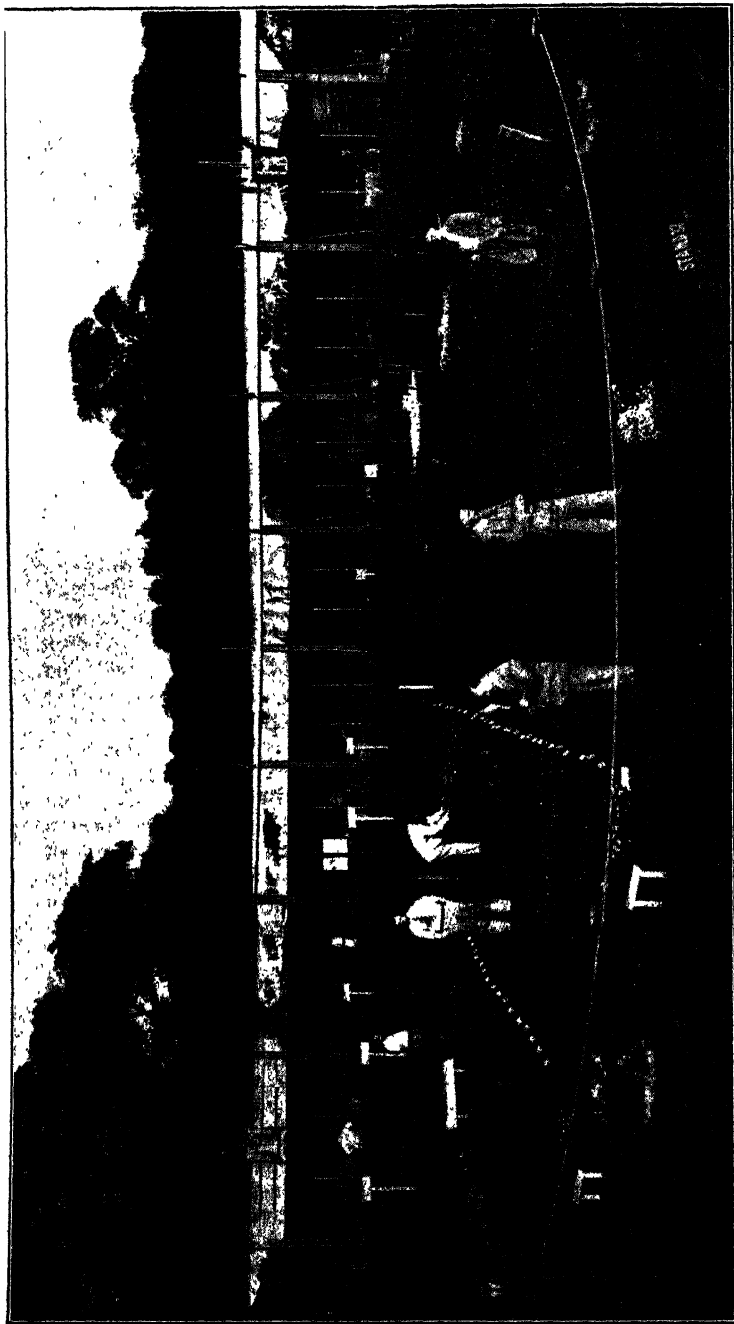
WILLIAM BURKITT.

Grange Hill,
Bishop Auckland.

AGRICULTURAL EDUCATION EXHIBITS AT THE WARWICK SHOW.

A NATIONAL Show nowadays provides a great opportunity for educational work. A large and increasing proportion of those who attend are prepared to be interested in the scientific aspects of the industry, and are on the outlook for any results of research that can be applied in their own practice. Educational and research workers too are now fully alive to the value of close personal contacts with practical men, and see, in the bigger agricultural Shows, their greatest opportunity of effecting such contacts. The past year has marked a very considerable advance in this form of educational activity; both at the "Royal" and at the "Highland" exhibits were staged which, whether in inherent value or in attractiveness, were very far ahead of anything of the kind that has been seen at former Shows. The thought and labour which had been devoted to their preparation were, moreover, well repaid by the interest displayed by the public.

In previous years the Education stand at the "Royal" has been filled with a collection of independent exhibits, each staged by a separate College or Research Station. This year only local Institutions were represented. The main exhibit was a co-operative effort on the part of the Harper Adams College (with its associated National Institute of Poultry Husbandry) and the Education Committee of the Warwickshire County Council. This gained greatly, in the matter of the general impression which it created, from the fact of its having been planned as a whole. In addition to the usual staging, a considerable plot of ground had been secured and laid out in growing crops. The stands were embellished with a striking series of decorative posters



Agricultural Education Exhibit and Demonstration Plots, Warwick Show, 1931.

symbolising, on the one hand, the history of agriculture, and on the other illustrating the main activities of the College; these were the work of the County Art Schools and added greatly to the effectiveness of the general picture.

In the College section attention was concentrated upon a comparatively small number of special subjects, and in most cases the object aimed at was to convey a definite piece of information in a convincing way. Especially striking was the exhibit of six pens of experimentally fed pigs, illustrating the main conclusions of five years' work in pig nutrition at Harper Adams College. This work is fully described by Dr. Crowther in the present volume.

The Advisory Chemist had set out an interesting series of plots illustrating the effect of soil reaction upon the growth and development of the commoner farm crops. It has of course long been known that certain plants, such as oats and potatoes, are much more tolerant of sour conditions than others like barley and red clover. Recent work has, however, led to the accumulation of much more precise knowledge, and the time is not far distant when the chemist, by means of a simple test, will be able to tell us whether a particular crop will tolerate the degree of acidity shown by a particular soil; or, if not, how much lime must be applied to ensure success. In the Warwick plots one series showed a number of crops growing upon a naturally acid soil, while in a parallel series the same crops were seen growing upon the same soil treated with an adequate dose of lime. In certain cases, as that of oats, the application of lime had made no apparent difference, whereas with sugar beet it had made the difference between a failure and complete success. The field demonstration was supplemented by a table showing, according to experience in the College area, the limits of acidity tolerable by a large number of crops.

Another aspect of the Advisory Chemist's work was illustrated by soil maps of Shropshire and Warwickshire and by a series of monoliths—*i.e.*, of vertical pillars with the various layers undisturbed—of typical soils of the area. The complete survey and mapping of British soils is a task of great magnitude and difficulty, because the various types are not only very numerous but shade one into another by infinitesimal gradations. Nevertheless the efforts that have already been made seem to indicate that the task is worth while, for the possession of a soil map makes it possible to correlate a great deal of experience about manuring and cropping which is otherwise very difficult to reduce to any kind of order.

The College plots included an excellent collection of grasses and forage crops as well as of the commoner poisonous weeds. There was also a small-scale illustration of the drill-strip method

of testing the comparative merits of cereal varieties. This is the method used by the National Institute of Agricultural Botany, one of whose testing stations is run by the Harper Adams College. Accurate data are now being collected year by year at a considerable number of such stations; each new variety that appears is being subjected to test, and thus precise knowledge of the characteristics of each is made available at the earliest possible date.

The Advisory Mycologist showed the results of his experiments in the control of finger-and-toe disease in cruciferous crops by applications of dilute corrosive sublimate solution. At the strength employed—one part in two thousand of water, or an ounce to 12 gallons—it has been found that an adequate application is about half a pint per plant in the case of cabbages and similar crops. This implies about 500 gallons of solution, containing about $2\frac{1}{2}$ lb. of corrosive sublimate, per acre. Although the control is probably too laborious for use on ordinary farm crops it is quite practicable on a market garden scale, and it has been shown to reduce the incidence of the disease by fully 60 per cent.

The bacteriology department staged a rather original piece of clean-milk propaganda showing separately the effect on the bacterial count of milk of each of the recognised clean milk precautions, such as the sterilisation of utensils, the use of small topped pails, and so forth. The interesting fact emerged that care and understanding on the part of the milker was approximately ten times as important as all the remaining factors taken together.

The Advisory Entomologist illustrated the results of three years' experimental work on the control of a number of harmful insects. Especially interesting were the beneficial results obtained by the use of drained creosote salts in the control of the carrot and onion flies, which are probably the most destructive enemies of their respective host plants. The Advisory Economist showed a series of charts comparing the costs and returns over a series of years of the sugar-beet crop with those of competing crops like the potato.

With the rapid growth in recent years of the British Poultry Industry, the National Institute for Poultry Husbandry has become a centre of great importance. The Warwick exhibit conveyed, by means of models and photographs, a very clear idea of the Institute's activities, both as a training School for students and as a centre of research. Current investigations, such as those dealing with vitamins, with artificial lighting, and with the comparative values of various protein foods, will be followed with added interest by poultry keepers who visited the stand. To take a single example, the work of the Institute has

led to the formation of quite definite and precise conclusions on the value of artificial lighting. Electric light is used primarily to lengthen the autumn and winter days up to about the duration of the natural days of April and May, when under natural conditions the egg output reaches its maximum. Artificial lighting will, it is pointed out, not take the place of correct feeding, of good breeding or of sound general management. Neither will it result in any very large increase in the annual egg average, the advantage of the lighted pens, over a 48-week period, being ordinarily between 2 and 4 per cent. There is some evidence that the use of lights enables the fowls to keep in better physical condition and has a beneficial effect on their body weight. But the main point is that artificial lighting is a means of changing the seasonal production of the birds, enabling them to produce a larger proportion of their total output during the period of high egg prices. With proper management a conservative estimate is that quicker maturing pullets under artificial light will show an increase of 10 per cent. in winter egg production, *i.e.*, for the period October to March inclusive; slower maturing pullets will give an increase of 7 per cent., and yearling hens 5 per cent. Such data, combined with a knowledge of the seasonal variation in egg prices, should enable the practical poultryman to form a very close estimate of the return that he may expect from the necessary installation.

The work of the Warwickshire County Organiser and his staff was well illustrated in the County Council section of the exhibit. The main lines of activity of the Committee, as follows from the character of the country's agriculture, are grass land management, milk production and horticulture. Other aspects, however, are by no means neglected. A model of a 30-acre small holding was worthy of special study; it was shown as devoted largely to grassland milk production, the land being intensively manured and grazed on the rotational system. A considerable area was devoted to potatoes, while as an important side-line was a plot of cabbages to be sold or fed as circumstances suggested. Pig and poultry departments completed a very well-thought-out system. Small demonstration plots of potatoes, sugar-beet and other crops illustrated some of the points that have emerged from County trials. Charts and specimens provided valuable information on the nutrition of dairy cows and on the handling of milk, while on the poultry side the essentials of feeding, housing and management were brought to the eye in a highly convincing way. This exhibit and others of its kind are of interest not only to the local farming community. They are well worthy of study, for comparative purposes, by all who are concerned with the direction of agricultural education in other counties.

In another part of the Showyard the Studley Horticultural and Agricultural College for Women had a marquee, which, if arranged on somewhat more conventional lines, was full of interest. Studley aims at providing an all-round training in the woman's side of country life, and so far as one could judge from the exhibit no important aspect is neglected. Milk production, butter and cheese-making, poultry keeping, bee-keeping, fruit and vegetable culture, fruit bottling and even carpentry are included in the comprehensive list.

THE FORESTRY EXHIBITION AT THE WARWICK SHOW, 1931.

THE care taken by those responsible for the arrangements again resulted in an assemblage at the 1931 Royal Show of Forestry exhibits outstanding in interest and merit.

This is a section of the Show which never fails to attract attention, not only among those directly interested in Forestry, but from the general public also.

In addition to the numerous examples, both practical and scientific, illustrating the technical side of Forestry, there were actual demonstrations of woodland handicrafts and operations, as well as a number of fascinating models which always prove to have a wide appeal for visitors.

In staging the Forestry Section, untiring work, begun long before the Show date, produced what is without doubt one of the most valuable features of the Royal Show.

The Stewards, with their Assistant Stewards, by devoting practically the whole of their time during the Show period to explaining the various exhibits to those interested, have given the section a greatly added instructional value.

The Council and the Stewards have always been able to count upon the ready co-operation of such public and professional bodies as the Forestry Commission, the Royal English Forestry Society, the Chartered Surveyors' Institute, etc., who have contributed most interesting exhibits.

In addition, success is largely dependent upon the assistance of land owners, their agents and their foresters, in the matter of exhibits, as well as upon the numerous business firms and others specialising in some form of British timbers or their products.

Many of these will be described more fully in the following notes, but an opportunity may be taken here of acknowledging the help given by all those contributing towards the fulfilment

of the Council's ideals for the furtherance of this very important national industry.

Outstanding among such contributors were Mr. J. H. Benyon and his advisers, for the magnificent examples of timbers and craftsmanship which were produced from his estate at Englefield, near Reading.

They are to be congratulated upon securing the highest award obtainable—the Special Medal for the best collection both inside and outside the Pavilion—as well as upon a number of other awards. Thanks are due to them for setting a standard of helpfulness which it is hoped will be followed by others at future Royal Shows.

It involves some expense to prepare and send large exhibits considerable distances, but it does not cost much to send, say, a tree guard, or a few boards by goods train—and all help to swell the value and interest of the section.

CLASS 1.—Boards of Oak, Ash, Elm and Beech, was not difficult to judge as it contained only one entry—that of Mr. J. H. Benyon.

These were of great widths and of high quality, especially the Oak and the Elm. The former measured 35 inches in width and was cut from a tree 130 years old, containing 125 cubic feet of marketable timber; the Elm board was 42 inches wide cut from a tree 150 years of age, containing 170 cubic feet. Both were grown in a loam soil overlying gravel. This collection secured the Silver Medal.

CLASS 2.—Boards of Larch, Spruce and Scotch Pine also contained only one collection—that of Mr. Benyon, who was awarded the Silver Medal for this class also.

The larch board was of particularly fine grain and quality, cut from an 86-year-old tree containing 80 cubic feet. It had been grown on plateau gravel.

Unfortunately there were no entries for CLASSES 3 and 4 for specimens of other kinds of Hardwoods and Conifers respectively.

CLASS 5.—Collection of Planks of Home-grown Woods, was won by the Midland Home-Grown Timber Merchants' Association, Chamber of Commerce, 95 New Street, Birmingham, with a collection of 9 planks of great uniformity and quality. They were :—

Oak	26 inches wide
Ash	18 " "
Elm	43 " "
Beech	36 " "
Sycamore	20 " "
Sweet Chestnut	21 " "
Poplar	19 " "
White Chestnut	16 " "
Scotch Pine	21 " "

It is gratifying that this Association of Merchants of British Timber should have contributed a combined exhibit of this kind, which it is hoped will prove helpful both to its some 54 members and to timber growers. The Silver Medal it gained was well merited.

Running the above closely and winning the Bronze Medal, was Mr. Benyon's collection, consisting of planks of 15 varieties of British timber.

CLASS 6.—Oak Field Gate for Farm use. There were five entries.

The Silver Medal was won by the Chatsworth Estates Company with a very well-made gate priced at £1 16s. 6d. It was fitted with an adjustable bottom hinge and its fastener was of the steel spring pattern. Care had been taken to "weather" or round the tops of the heel and head in such a way that water would run off the *sides* of the gate and not into the mortice cuts for the top bar.

The Bronze Medal went to Mr. Benyon for an excellent gate of different pattern.

CLASS 7. (Five entries.)—Field Gate for Farm use. The previous honours were reversed, Mr. Benyon gaining the Silver Medal for a beautifully made larch gate costing £1 12s. 6d. and the Chatsworth Estates Company the Bronze Medal for a gate in larch with oak head and heel.

The spring fastener of the former was carried well above the clapping post, facilitating opening from horseback.

CLASS 8.—Field Gate of Rent or Cleft Timber. This class had no entries; though had it been possible for the owners of exhibits of Nos. 7 and 12 to have entered in this class their gates which were shown in Classes 6 and 7 respectively, these probably would have formed winning exhibits.

CLASS 9. (Five entries.)—Self-closing Wicket or Hunting Gate of Home Grown Timber. The Silver Medal was won by Mr. J. H. Benyon with a very good wicket in oak, costing £1 1s.

The Chatsworth Estates Company secured the Bronze Medal for their oak gate with an adjustable top hinge; total cost £1 5s. 6d.

Generally, as to gates; there were many which had special merits, such as cheapness, methods of bracing, fastening, etc., and all were soundly practical and formed one of the best collections of gates I have seen.

As minor criticisms; very few were bolted with galvanised bolts and nuts and in some the iron guide loop for the spring fastener had not been made long enough to fill the added purpose of strapping the head to the top bar. The "weathering" of the head and heel, already referred to, was a point missed in several instances.

CLASS 10.—Tree Guard. Only one of the two entries was present, that of the Chatsworth Estates Company, which was awarded the Bronze Medal. Its three sides, made of halved larch thinnings, pointed at their tops and spaced about 3 inches, were supported on three round larch posts. Next to the ground the spaces were filled by further pointed 2-foot 6-inch lengths of halved larch which effectively excluded hares and rabbits. One side was hinged and this made access for cleaning and pruning easy. Had the bottoms of the posts been creosoted, the guard would have deserved the higher award.

CLASS 11.—Fencing, of Home Grown Wood. Though entries were good and varied—7 in number—and in most cases the workmanship excellent, there did not appear to be an example of an *ideal* type of cheap and effective farm fencing suitable for use with mixed stock—horses, cattle and sheep.

Exhibit No. 27, shown by Mr. G. C. Wolryche-Whitmore, of Dudmaston, Bridgnorth, was awarded the Silver Medal. This was a creosoted morticed post and rail fence of considerable strength, 43 inches high, costing 4s. per yard. The top rail was double, one rail being let into either side of the main posts—an obstacle which would not let one off lightly if one's horse made any mistake in negotiating it!

Mr. Benyon's nailed-on post and rail fence won the Bronze Medal. The main posts were 5" × 4" oak, dug in, 9 feet apart, carrying 4 larch rails 4" × 2" spaced at 8 inches. There were intermediate posts of larch 4" × 3" pointed and driven. The cost was 3s. 2½d. per yard.

CLASS 12.—Fencing, of Foreign Timber. There were only two entries, both by Mr. J. H. Benyon, who was awarded a Bronze Medal for the one consisting of creosoted posts with one top rail and three strands of galvanised wire beneath—the lower two of twisted and upper one of barbed type.

There were no entries in CLASS 13 for Nurserymen's specimen and ornamental trees, and it is to be regretted that none availed themselves of this opportunity given.

The section for non-competitive exhibits was well filled.

First among those from Public Bodies came that of H.M. Forestry Commission, which attracted much attention. Its chief feature was, perhaps, the series of sample soils of diverse varieties taken from some of the Commission's planting areas, with examples of the kinds of trees which can be planted successfully in them.

In addition, there were shown models of forest workers' dwellings; a model of a forest fire look-out tower as used in Canada and proposed for this country; examples of the uses of coppice and thinnings; specimens of diseases and a number of instructive plans, photographs and statistical sheets.

The British Wood Preserving Association, of 166 Piccadilly, London, W.1., filled a bay with a large number of interesting examples of treated and untreated posts and articles of various kinds of timber which had been in exposed and other places for varying periods.

They showed a "butt treatment" plant which had the merits of cheapness and simplicity and also a model of a pressure and steeping tank creosoting plant.

This Association is compiling a list of creosoting plants of various types, both privately and commercially owned, throughout Great Britain, and would be glad to hear from any owners of such plants who will be good enough to notify them.

The Association is doing much good work in the direction of timber preservation against attacks from many destructive agencies, both fungus and insect, including that of the Death Watch Beetle. The exhibit gained a Silver Medal.

The Chartered Surveyors' Institution of 12 Great George Street, Westminster, S.W.1, exhibited sections and veneers of home-grown timber and examples of uses for Oak, Beech and Elm—in particular the use of oak for barrel-making.

These exhibits were loaned from the Institution's Museum, which has done so much to help its members and others in matters of up-to-date forestry. A Bronze Medal was awarded.

The Great Western Railway had, under arrangements kindly made by Mr. C. B. Collett, a very well-staged and most interesting exhibit which well merited the Silver Medal awarded. This consisted of a large number of articles used on their railway systems and made from home-grown timbers.

These ranged from artificial limbs made from willow (*salix coerulea*) to buffer pads in elm, sack-barrows in ash, rail keys in oak, pulley bearings in beech, etc.,—some 72 articles in all.

The predominating English woods used appear to be Oak, Ash and Elm.

The courtesy which prompted the staging of this exhibit, the excellence of its arrangement and the clear demonstration of the English timbers used should, it is hoped, lead to increased business between English timber growers and railway companies, to the advantage of both.

A Silver Medal was awarded to the Royal Agricultural College, Cirencester, Gloucestershire, for a large and attractive model, demonstrating in miniature, Forestry Engineering and the various methods of extracting timber from felled areas: log slide, railway, tractor, raft, horse, ropeway, tramline, etc. This ingenious exhibit found a large number of admirers.

Exhibits of interest from private estates comprised four.

That from Mr. J. H. Benyon included a number of articles made from English timbers. These showed a high standard

of craftsmanship—particularly such articles as the “linenfold” panels and the overmantel in oak.

This exhibit was taken into consideration when awarding to Mr. Benyon the Royal Agricultural Society's Special Silver-Gilt Medal for the best general collection of exhibits both inside and outside the Pavilion.

Mr. J. S. Corbett, O.B.E., of The Bungalow, Markgate, St. Albans, gained a Silver Medal for his interesting collection of specimens, photographs, etc., specialising Oak—its many varieties and uses.

These varied from twigs and hand samples of some 80 different varieties of oak to examples of panelled oak doors inlaid with bog oak.

The restoration with English Oak of a finely-timbered mansion was illustrated by plans, photographs and specimens of the timber.

Mr. George A. Peacock, Nantyrhiw, Upper Canning Street, Ton Pentre, Glamorgan, exhibited a specially-prepared series of drawings and specimens designed as an aid to the scientific study of the Growth of Trees and some of the defects to which trees and timber are subject.

This instructive exhibit was awarded a Bronze Medal.

A Silver Medal was awarded to Lieut.-Colonel the Hon. F. W. Stanley, D.S.O., Cotswold Park, Cirencester, who showed and personally demonstrated a new type of iron fastener for slip rails, which he has patented.

Its use appears to overcome one of the obvious disadvantages of this form of “gate.” The loose bars could be detached readily by hand or hunting-crop in such a way that they could either be swung open on their hinged ends or the freed ends merely dropped to the ground. By thus dropping the two top bars and leaving the lower one or two bars in place, the latter formed an easy jump even for a child's pony.

There must be many situations where this device for barring an opening could be used with economy and convenience and one such in every fence of a badly “wired-up” country would be a boon to hunting people.

Under the “Purely Commercial” heading, six entries were shown. A Silver Medal was awarded to Forest Products Ltd., Huntley, Gloucester, for Gates, Rustic Work, Fencing, Seedlings, Transplants, Covert Plants, etc.

They specialised a twisted wire and pale fence made of rent Douglas, on the same principle as the well-known chestnut pale fencing.

The special interest of this exhibit was perhaps that, being a subsidiary business organisation of a large estate, it showed what could be done by means of direct commercial enterprise,

to find a profitable outlet for timber and its by-products—thinings, etc.

Another Silver Medal was won by the Powell Duffryn Steam Coal Co. Ltd., 1 Great Tower Street, London, E.C.3.

This firm staged a series showing pictorially and by examples, the evolution of a wood preservative from its earliest stages—coal (and the forests from which coal measures were formed),—through various processes to the finished product, "Presotim," and the return of the latter to timber, as a modern preservative.

A Bronze Medal was awarded to the English Forestry Association, Ltd., The Knowle Nurseries, Caversham Heights, Reading, for a comprehensive collection of Seedling Trees, Transplants, and Covert and Hedge Plants.

Messrs. Christy & Penny, Ltd., of 219 Queen's Road, Bayswater, London, W.2, demonstrated with their "Wade" motor-driven cross-cut saw, as also did the T. L. Smith Company of 13 Victoria Street, London, S.W.1, with one of their "TeLeS" motor cross-cut saws.

Messrs. Trehwella Bros., Pty., Ltd., Island Road, Handsworth, Birmingham, exhibited one of those useful Monkey Winches which they specialise—invaluable to foresters and others who have to clear land of trees or stumps.

Demonstrations of interest were given by Forest Products, Ltd.; W. Rees, Henllan, Cardiganshire; and George Walker, of High Street, Syston, Leicester.

The first of these was cleaving Douglas Fir and Chestnut for split pale fencing and Birch besom-making and tying.

That by Mr. W. Rees was the turning by hand on a lathe of bowls and other articles in sycamore.

Mr. Walker's expert demonstrated the cleaving of Oak, Ash, and other kinds of English timber for such varied uses as gates, fences, spokes, ladder staves and hurdles.

There can be as little doubt of the usefulness of the Forestry Section as of its manifest and manifold interest.

As a stimulus to English forestry as well as in forming a valuable aid in scientific and practical matters connected therewith, it performs a service which fully justifies, and I feel sure rewards, the unremitting efforts of its inaugurators.

NELSON ROOKE.

Olliver,
Richmond, Yorks.

REPORT OF THE JUDGES ON THE PLANTATIONS AND HOME NURSERIES COMPETITION, 1931.

THE Plantations and Home Nurseries Competition was this year confined to Shropshire, Staffordshire, Cheshire and Lancashire (excluding Furness and Ulverston). Having regard to the very large acreage of woodland in this area (well over 130,000 acres), the entry—14 from four estates only—was very disappointing. It is true of Lancashire that it is well wooded but badly timbered, and not a great deal was expected from this county. The remaining counties, however, contain over 100,000 acres of woodland according to the Forestry Commission census, and the poor response from such areas, studded in very many places with excellent woodlands and plantations, gives rise to the opinion that either little or no value is set on these competitions by the local landowners, or that they take no interest in their woodland. We see no reason to alter the opinion expressed last year that the object of this competition is still not fully understood and that the keynote is helpful rather than destructive criticism. Another point which we wish to emphasise is that in our opinion the title of these competitions should be amended or altered to "Woodland, Plantation and Estate Nursery," as in several cases areas carrying very fine timber had not been entered owing to the fact that they were considered too old to be called "plantations." Pre-war ideas on the necessity of cleanliness still seem to hold good and several plantations were seen which, although suffering from the shortage of labour so prevalent on forest estates to-day, were, judged by their growth and general condition, far superior to others entered by their owners.

An important point noticed was the comparative lack of care taken over hardwoods compared to conifers. Young hardwoods need just as much or even more attention than conifers; being slower in growth, defects in growth uncorrected at once are far more difficult to eradicate. Two of the estates judged as a whole were particularly interesting, as in both cases order is gradually emerging from chaos caused by neglect and indiscriminate war fellings.

On all estates we were agreeably surprised by the meticulous care with which records and costings have been kept. The value of such records is shown by the following case. A small wood of oak and larch was seen in which the oak, now 8 years old, was doing badly, although soil and aspect appeared suitable. Reference to records showed that when planted the oak was

nearly 3 feet in height, far too big, in fact, for possible success. The difficulty and high cost of raising forest crops on poor soil was also proved by costings showing that in certain cases plantations had cost over £20 per acre to establish. Much coppice has been planted up with conifers and the disposal of thinnings is beginning to be a serious problem. Whether this wholesale destruction of underwood is wise remains to be proved, but we were informed that on one estate on which underwood is still carefully and systematically managed, sales were increasing rapidly as a result of the abolition of many local underwoods. There seemed in this district a tendency to cling to hardwoods which, when planted in soil of suitable depth, appear to do very well and which when mature will be definitely easier to sell than softwoods competing against foreign produce and that of government areas.

We wish to congratulate Lord Barnard on the general appearance and management of his Wellington estate, which unfortunately was not entered as a whole. His woodlands appear to be in a high state of efficiency, his estate yard is a model of its kind, and our inspection of the "strip" felling and planting on the Wrekin was one of the most interesting items in our tour.

On the Earl of Powis' Walcot estate the growth of timber is remarkable. On the Merry Dingle area, which was awarded the Medal for the best plantation, we were informed that the felling immediately previous produced six larch containing 150 feet apiece, one being 94 feet long with 240 cubic feet in it, and a spruce of 130 cubic feet. One hundred and eighty-six larch averaged 72 cubic feet and 37 spruce over 60 cubic feet apiece. We also saw in the vicinity a Douglas fir equal, if not superior, to the one listed in "Trees of Great Britain and Ireland" as the largest of its kind in the country. The Walcot fir is 110 feet high and 17½ feet in girth at breast height. Its quarter girth measurement at 45 feet is 32 inches and the estimated content is 720 cubic feet.

No trouble was experienced in keeping our appointments, and we wish to thank the competing landowners and their agents for their hospitality and interest in our work.

AWARDS.

CLASS I. (*Hardwoods.*)

One entry only. No award. Several blocks were seen of considerable merit which would have secured an award had they been entered.

CLASS II (a). *Conifers under 20 years.*

In this class a plantation on Lord Powis' Walcot estate—Merry Dingle—was awarded the Silver Medal. It consists of

9 acres of a 19-years-old plantation occupying a V-shaped position on a hillside, and rising some 150 feet with a steep easterly aspect. The prevailing winds being S. and S.W., it enjoys a favourable position and wind effect is not noticeable. The soil is derived mainly from the Silurian formation, and is fairly deep, with good natural drainage. The previous crop was principally larch and beech, some oak, elm and chestnut being scattered about the area, and it is noteworthy that the merchant who purchased it 20 odd years ago says that the crop of timber from this area was the heaviest per acre he ever had to deal with.

The forest floor is in excellent condition at present under the new crop of trees—the old stools have now disappeared and a carpet of raw humus has accumulated from the shed needles of the Japanese larch and Douglas fir which have now practically assumed command over all other species. The species which were planted to form the present crop were divided equally into coniferous and broadleaved, *viz.*, 2 Oregon Douglas, 2 Japanese larch 2-years seedlings, and one each wych elm, Spanish chestnut, beech and ash, the spacing being 5 feet by 4 feet; and it is an interesting fact that, while the management exercised the utmost care in the initial stage of planting to ensure that the mixture was absolutely correct to plan, and while no damage by pest has occurred to cause deviation therefrom—the growth of the conifers has frustrated the scheme so that what remains now is a fairly dominant crop of Douglas fir with about a third Japanese larch fighting for light and air. Thinning and pruning operations are in progress and consist in the main of extracting suppressed trees, and cutting out a few wych elms which have made by far the best fight of any of the broadleaved species, and in some cases have really beaten the Douglas, though they have no value as compared to the fine stems of the Douglas fir thinnings. The chestnut, beech and ash are entirely suppressed and are yielding thinnings of little value. The Japanese and Douglas fir thinnings command a ready market at remunerative prices for agricultural fencing.

The obvious conclusion arrived at is that it will eventually be necessary to cut out all the Japanese larch and leave the Douglas fir to mature. The crop should result in a quality Class II Stand according to the Forestry Commission tables—producing per acre a total volume of 6,570 cubic feet at the age of 45 years from planting. When this is considered in the light of the fact that the only alternative use of the land would be as sheep grazing, the result must be encouraging—at least to the management. Some measurements were taken of the present crop, and a Douglas fir bored for increment test gave 7 rings to the outside inch, the tree operated on being 6½ inches in

quarter girth at 5 feet and 52 feet to the top. The relative girths of the Japanese larch and Douglas fir were :

Largest Douglas fir girthed at 5 feet up to 9 quarter girth, the average through the area being about $5\frac{1}{2}$ quarter girth.

Largest Japanese larch girthed at 5 feet up to $5\frac{1}{4}$ quarter girth, the average through wood being $3\frac{1}{2}$ to 4 quarter girth.

Thinnings may be estimated to produce 25s. to 30s. per acre on the 9 acres = approx. £12, and a second thinning will be necessary in 3 to 5 years to extract suppressed Japanese larch.

This plantation was also awarded the Gold Medal for the best plantation entered for competition.

The Bronze Medal was awarded to Stokeswood, the property of Mr. J. R. Allcroft, of Stokesay Court, Onibury, Shropshire.

CLASS II (b). *Conifers over 20 years old.*

White Cottage Plantation belonging to Lord Barnard's Wellington, Shropshire, estate, 35 to 40 years old, planted 4 feet apart, was awarded a Silver Medal.

The position, soil and aspect of this block are ideal for larch growth, and a very successful crop of larch 37 years old stands on the area of 45 acres. The average distance apart of the trees was 9 to 10 feet, or about 430 poles to the acre, with cubic content amounting to 6 or 7 feet per pole. The canopy is good and the ground below is exceptionally clean.

Some stems had recently been cut off, and examination showed them to be quite free from heart rot. Very little canker was noticed, although the wood at one time was badly attacked. Damaged trees were cut out, barked, and the rubbish burnt up.

The general appearance of the crop and prospects of a heavy yield are good, as little damage occurs from wind.

"May" Plantation, belonging to Lord Barnard, 20 acres, 37 years old, 4 feet apart, was awarded a Bronze Medal.

The Wroxeter section of the estate appears to be very suitable for larch growing, as both this area and the White Cottage Plantation are well-stocked young larch woods. The planting was done originally by pitting at 4 feet apart and about 100 hardwoods per acre were set out originally in mixture with the larch, but very few of these remain now.

A noteworthy experiment in underplanting has been tried in the lower portion of this wood—with a fair amount of success, as the larch is not growing in sufficient number to shade the ground. The under-story trees are groups of *Thuja gigantea*, *Cupressus Lawsoniana*, Oregon Douglas, Norway spruce and beech—the Norway spruce have formed the most effective shade

so far. The Douglas tend to put on too much leader and consequently are thinly branched.

There have been occasional Douglas fir spaced out in the original planting and the coarse and rapid growth of these has been so injurious to the surrounding larch crop that the Douglas are being taken out. Wind has some effect here, and where possible hardwoods are being left to steady the larch crop.

The stems show signs of having been affected earlier in life by canker, but are now generally recovered and carrying good healthy heads.

The timber should be fit to cut at about the present density in another 15 to 20 years, and will not form very heavy boles. If further thinnings are carried out, there is danger of wind-blow on the class of soil found here.

In CLASS III (a) (*Mixed Conifers and Hardwoods, 10 to 20 years old*), Captain J. B. Littledale of Bunbury, Cheshire, was awarded the Bronze Medal for a plantation of 27 acres.

This area is slightly undulating with an eastern aspect. Planted in 1921, it suffered extremely from drought; the following season further damage resulted from the same cause, and the gaps were filled by 2-year 2-years plants, chiefly Scotch pine. Had it been possible to secure plants, the intention was to stock the area with Corsican pine in preference to the former species. Frost damage was experienced amongst the beech and other hardwoods originally planted, and gaps in the crop had been caused. The oak now appears to promise the best amongst the hardwoods and the intention is to nurse up the oak with the existing Scotch pine, clear out blanks and re-plant with Corsican pine in a few seasons' time. The chief trouble on this retentive soil and damp situation has been the cutting back of new growth in spring by frost, but if canopy is available to screen the replanting, success will be much easier to attain.

CLASS III (b). *Mixed Hardwoods and Conifers over 20 years.*

A Silver Medal was awarded to the Earl of Powis for Triangle Plantation on the Walcot Estate. This wood occupies an elevated position with a slightly northern aspect, and is carrying a crop of Oregon Douglas fir mixed with European larch and ash.

The formation costs were given as £11 for fencing and £30 for plants. Planting at 4 feet by 4 feet. No rabbit fencing was required, and 2-year-old plants were used. Thinnings have been made periodically and the young poles find a ready sale locally for fencing.

Douglas fir is the dominating species, but the intention is

to keep this species in hand by occasional extraction of dominant trees and so encourage the formation of a final crop of larch and ash, retaining the Douglas merely as nurses and shelter. The situation as regards wind damage appears to render this treatment imperative, as a final crop of Douglas fir would be very liable to windfalls; and on the other hand, if ash can be worked up to form a fair proportion of the crop, wind damage will be greatly reduced.

A proportion of the larch are affected by canker.

Periodic extraction of trees to allow ash poles to form larger heads is intended and the treatment is being conducted on satisfactory silvicultural lines in view of the altitude and exposure.

The average Douglas fir measure, at 5 feet from ground, $5\frac{1}{2}$ quarter girth, and are 45 to 48 feet high to tip, containing 3 to 4 feet per tree. The larch and ash fall short of this, but have been handicapped by the shade of the Douglas.

This wood will require very careful management to ensure safety and a final crop of larch and ash.

Little Hill Plantation, belonging to Lord Barnard, was awarded a Bronze Medal in this class.

This plantation, 36 acres, 30 years old, planted 4 feet apart, soil gravelly loam, occupies a conical mound at the foot of the Wrekin, and is carrying a somewhat irregular crop. Apparently when planting was done, the species were arranged in groups to suit soil patches, and the result is that pure groups of trees occur all over the area. The crop is chiefly larch, but self-regenerated ash exists in good quantity, and also some good specimens of Douglas fir and Corsican pine. The canopy is good and thinning has been carefully done; the trees are forming clean stems and promise to yield a good crop.

CLASS IV. *Exotic species other than those mentioned in Class II.*
No entry.

CLASS V. *Coppice.*

Lord Barnard's Wellington Estate—"Cressage Park"—Coppice with Standards, 80 acres, was awarded a Silver Medal.

The area inspected here is flat, the soil is a heavy loam and oak appears to grow well. It is being worked as a coppice with oak standards 100 to 120 years, thinly spaced. The demand for the produce of coppice cuttings principally comes from the Staffordshire Pottery district which is in close proximity. Price for cut material averages about £9 per acre on 8- to 10-acre blocks cut over at intervals of about 15 years, the estate doing all cutting, bundling and carrying the material out to the edge of a hard road.

It may be of interest to show the schedule of material recently cut out :

Year	Rods	Heads	Stakes	Bundles of Pea Stakes	Bundles of Bean Rods	Total for Year
1928-29	47,500 £11 3s. 9d.	14,575 £29 3s. 0d.	30,475 £22 7s. 3d.	1,766 £22 1s. 4d.	594 £8 13s. 3d.	£93 8s. 7d.
1929-30	45,800	17,600	32,350	837	655	£101 16s. 9d.
1930-31	33,000 at 4s. 6d. per 100	22,050 at 4s. per 100	35,700 at 1s. 6d. per 100	379 at 3d. per bundle	535 at 3½d. per bundle	£91 7s. 3d.

Rods, heads and stakes are sold by the 100, and pea and bean rods by the bundle, the material from the cutting of the coppice being practically all used up, and the ground being left clean and ready for the new crop of stool shoots.

The burning of charcoal has been discontinued in the district as it could not be sold at anything like a remunerative price. The peeling of oak coppice wood for bark for tanning leather has also had to cease owing to the very low price obtainable.

This coppice was clean and well managed with very carefully trimmed stools, and the oak standards are doing well.

CLASS VI. *Estate Nurseries.*

Broughton Hall Estate Nursery, Wetwood, Eccleshall, Staffs. Area, 3 acres 1 rood 14 perches.

The site chosen for the nursery is open and fully exposed to the westerly gales and stands well above the frost-line—a precaution which is not always foreseen in the choice of nursery sites.

The soil is fairly good sound loam inclined to clay, and it is possible to grow the stock direct from seed.

Since the planting season of 1925-26, the whole of the transplants used in reconditioning and replanting have been grown in the Estate Nursery. Once-transplanted Scots pine, European and Japanese larch, Douglas fir and Sitka spruce were purchased and lined out, but since the first year's programme nothing but 1-year and 2-year seedlings have been purchased.

Losses have been extremely small, and an average of 65 per cent. of first-grade transplants have been raised from every 100 seedlings lined out. With the exception of ash, the majority of the transplants raised have been conifers. The only costs kept have been those of actual lining out, all of which have

been done with the transplanting board at an average cost of 4s. 8d. per 1,000.

A demand has been created for any trees not required for planting out on the Estate, and it is considered that these can be sold at a price showing a fair margin of profit.

The stocks are exceedingly healthy and vigorous, and in view of the exposure and aspect, will produce the thoroughly well-ripened transplants which ensure success. It is worthy of note that frost damage had occurred here on June 25th as the bracken and young spruce leaders were badly browned in the Broughton Birches area, which is about 120 feet lower elevation.

Nursery stocks comprise :

237,000 transplants 1 year 1 year and 2 year 1 year.

12,600 transplants twice transplanted.

5,000 poplar, willow and cotoneaster cuttings.

The ornamental section contains many fine specimens of both coniferous and broad-leaved trees, and of flowering shrubs. The whole area was under cultivation, very clean and well tilled.

Although the only entry, it was considered that this nursery well merited the award of a Silver Medal.

CLASS VII. *Best managed woodland estate.*

The Gold Medal for the best managed woodland on an estate of not less than 1,000 acres has been awarded to the Hales Estate, near Market Drayton, in Shropshire. In this case, as in the succeeding one, the woodlands were in an exceedingly bad state when taken over by the present owner, Mr. E. B. Hall, in 1918. The woodland extends over an area of some 400 acres, and during the past twelve years has been cleared and replanted or improved at the rate of some 20 acres per annum.

The woodland area is an interesting one as it forms an excellent example of what can be done on a "patchy" type of soil by carefully choosing the species to suit and by not attempting to plant species that require depth or comparative richness of soil on areas definitely unsuited to them.

The area is undulating and lies about 500 feet above sea-level, the geological formation being New Red Sandstone. Rainfall comparatively low. The character of the soil is well indicated by the ground flora, the poorer parts carrying bilberry and heather, with bracken on the better-class areas. Hardwoods have been planted wherever the soil appeared suitable and their present condition appears very satisfactory as a whole.

The largest block, "Burnt Wood"—about 150 acres in extent—is very representative of the whole, being of a distinctly

patchy type, very wet in some parts and in others underlaid by "moorpan" at a depth of 4 inches or so. Below this is a good depth of dry, mellow, sandy loam. The species planted on this area are Scots and Corsican pines, Japanese and common larch, Douglas fir, Sitka spruce and beech. In the wettest places "tumping" or mound planting between open drains has been successfully adopted, the contrast between plants treated in this way and others planted on the flat being most marked. The area suffers from frost. Douglas is very definitely not a success, being slow to get away, and is, moreover, badly infested by chermes. On old hardwood areas "honey-fungus" attack is common. Scots pine appears to do best and on poor yellow sands is over 25 feet high at about 20 years, with a satisfactory girth measurement.

One of the most interesting blocks was Badger Wood, which forms two sides of a valley of about 10 acres planted for sporting purposes combined with forestry. In this the larch, both European and Japanese, is growing extraordinarily well. Douglas fir has done badly, but was only planted here because the *Abies grandis* suggested in the original scheme was unobtainable in quantity at the time. Ash grows well in the hollows, being up to 10 feet in 5- and 6-year plantings.

Costings have been carefully kept and are high, especially where areas were planted by contract; but in one case where the overall cost of planting and establishing was £25 per acre, over £11 per acre was paid for cleaning up worthless or tangled scrub, a debit sum which in fairness can hardly be charged to the present crop.

Transplant costs were also high at the time of planting the earlier blocks, being up to £8 per 1,000 for Corsican pine, for example.

The nursery is situated on the highest part of the estate and is clean and well kept. At the time of inspection it contained about 107,000 transplants of various types, chiefly larch. On vacant ground lupin is grown for green manure.

The estate yard is excellent, and the plant modern. It comprises an automatic rack bench carrying a "21-inch cut" saw, also moulding, planing and morticing machines. Power is supplied by a 25-h.p. turbine and a 25-h.p. semi-Diesel engine for use when the water is low. The turbine, which is situated half a mile away, can be shut off from the yard.

Costings and all information regarding each block are recorded on a card index kept in the estate office. Park and amenity timber is very carefully looked after.

The plantations as a whole are young, but after inspecting their present growth and the way they are being managed, and taking into consideration the type of derelict woodland from

which they have been formed, we had no hesitation in making this award.

The Silver Medal in this class was awarded to the Exors. of the late John Hall, for the Broughton Estate, Eccleshall, Staffs.

The woodlands in this case have been formed by purchase from various owners during the last fifteen years, and on purchase were in very bad order owing to the fact that the best timber had been removed in many cases, little replanting had been done and the areas were waist deep in bracken and bramble. The woodland in hand amounts to some 250 acres, the majority of which has now been replanted according to a plan which should combine timber production and sporting value very satisfactorily indeed. The nursery already reported on is an excellent one. The estate is very liable to damage by spring frosts, and we noticed that even in June this year recent frost damage was evident. Considerable difficulty has been experienced in raising Sitka spruce for this reason and in the blocks liable to spring frost damage the planting of Douglas fir is now deferred until April. Apart from this the growth shown by all conifers is decidedly encouraging, and where hardwoods have been planted they appear to be doing well.

An interesting example of coppice conversion was shown by the Alders plantation, originally devoted to the growing of crate wood for the Potteries. This has been cleared and restocked with Black Italian poplar at 12-foot intervals which, at the moment, is growing well. The spacing for such a light-demanding species appears very small and it will be interesting in future years to see how the increment of the trees is affected as the crowns gradually approach one another.

Costings have been accurately kept, and, owing to the neglected conditions when the woods were taken over, are high. It is, however, most interesting to notice the difference between the cost when planted by contract and the cost when planted by the estate staff. The marketing of the standing timber where replanting was to be done has been a matter of some difficulty owing to its inferior quality, but up to £20 per acre has been obtained. This has enabled practically derelict land to be converted to plantations which show every indication of success.

The ornamental timber consists chiefly of large oaks which are being gradually cleaned up and brought into a healthy condition. The estate yard is well equipped, well managed, and carries a large stock of oak timber.

The Bronze Medal was awarded to the Stokesay Court Estate, Onibury, the property of Mr. J. R. Allcroft.

These woods are considerably older than those of the other competitors and have many natural advantages. Had they been taken in hand more carefully 20 or 30 years ago this

would have prevented the difficulties that have to be faced to-day.

The estate extends to about 7,000 acres, with 640 acres of woods at elevations between 400 and 500 feet above sea-level. The soil is in most cases ideal for tree growth, being a well-drained loam over Ludlow rock. As might be expected, ground vegetation is luxuriant and, as a result, considerable sums have to be spent on clearing during the first few years after planting. Clearing has, however, been done too well in some cases, as growth has been cleared at ground level where a removal of the upper layer sufficient to clear the leading shoots of the trees would have been perfectly satisfactory and would have considerably lessened expenses.

A striking feature in the woods is the way in which ash regenerates itself and the speed at which it grows; we are of opinion that the ash seedlings, if carefully looked after, will in years to come prove a far more remunerative proposition than the coniferous plantations. Beech, Spanish chestnut and sycamore are growing well, and while the oak, of which there is a large acreage, is fair, the soil appears hardly deep enough for it.

During the war a considerable area was felled, but over 100 acres have been replanted and progress is up to schedule. In some plantations trees do not seem to have got away too well in early years and we are of opinion that this is due to the fact that the plants, practically all 2-year 1-year transplants, were put in by notching with Schlich's spade, hardly a suitable tool to use for 3-year-old trees on a soil with a considerable amount of clay in it. Cramping of the roots and the difficulty experienced by the root-hairs in penetrating soil glazed and compressed by a notching tool would account for a slowness in growth for three or four years after planting. The cost of labour in planting by notching is given as approximately £1 1s.

The importance of shelter as compared to elevation is very marked on this estate. A block of Douglas fir growing at over 900 feet elevation on an easterly slope contained 75 trees on half an acre. They were about 80 feet in height with an average content of 25 cubic feet per tree at about 35 years of age. These trees were low down the slope in complete shelter. Higher up towards the crest the trees had almost disappeared. In a deep ravine at a slightly lower elevation two larch trees were standing which, taken jointly, would probably give a content measurement of over 300 cubic feet.

Conversion for estate use is done with a 12-foot hand-rack bench, the maximum cut being 21 inches. Inserted tooth-saws are preferred. Power is provided by an overshot water-wheel developing 8 to 10 h.p. with a good head of water.

Apart from the attacks of *Tortrix viridana* already mentioned,

a certain amount of trouble from pests and disease is being experienced. On the young Douglas, chermes is common, and in spite of what may be said to the contrary is obviously checking growth. There is also a not unappreciable loss from honey-fungus, which has also killed a certain number of larch. Rabbits are not numerous on the whole, but have ruined one hardwood plantation. There is no working or felling plan available for the estate, but a definite planting programme exists and a considerable number of "costings" were available. Labour employed is one man per hundred acres.

W. H. BENNETT
A. D. C. LE SUEUR, F.S.I. } *Judges.*

REPORT OF THE JUDGES ON THE ORCHARDS AND FRUIT PLANTATIONS COMPETITION, 1931.

*(Restricted to the Counties of Cambridge (excluding the Isle of Ely),
Suffolk, Essex, Huntingdon, Bedford, Hertford and Middlesex.)*

CLASSES.

FOR GROWERS OF 10 ACRES OF FRUIT AND UNDER—

1. For the best managed orchard or orchards of standard or half standard fruit trees planted not less than 8 years, being not less than 1 acre and not more than 10 acres.
2. For the best managed plantation in bearing to include any kind of top fruit planted not less than 8 years, the majority of the stems to be not more than 3 feet, being not less than 1 acre and not more than 10 acres.
3. For the best managed plantation of bush fruit planted not less than 4 years, being not less than 1 acre and not more than 3 acres.

FOR GROWERS OF OVER 10 ACRES OF FRUIT—

4. For the best managed orchard or orchards of standard or half standard fruit trees planted not less than 8 years, being over 10 acres and not more than 30 acres.
5. For the best managed plantation in bearing to include any kind of top fruit planted not less than 8 years, the majority of the stems to be not more than 3 feet, being over 10 acres and not more than 30 acres.

6. For the best managed plantation of bush fruit planted not less than 4 years, being over 10 acres and not more than 30 acres.

OPEN TO ALL GROWERS—

7. For the best managed orchard or orchards of top fruit trees planted since October, 1923, being not less than 2 acres.
8. For the best managed plantation of strawberries over one year's planting, being not less than 1 acre.

Prizes of First, Silver Medal, and Second, Bronze Medal, were offered in each Class.

Judging commenced in Essex on June 15 and was completed in Middlesex on June 19. The itinerary as arranged by Mr. E. C. Boughton, of the National Farmers' Union, was found to work admirably, the inspection of competitors' orchards and plantations being completed in the scheduled time.

The entries numbered 36, viz. :—

Class 1	.	.	.	.	.	2 entries.	
" 2	.	.	.	.	.	4	" (1 withdrawn).
" 3	.	.	.	.	.	3	"
" 4	.	.	.	.	.	5	" (1 withdrawn).
" 5	.	.	.	.	.	6	"
" 6	.	.	.	.	.	4	"
" 7	.	.	.	.	.	7	"
" 8	.	.	.	.	.	5	"

The awards were made as follows :—

CLASS 1.—No award.

CLASS 2.—No first prize.

Second : Mr. Ernest Granger, " Appledene," Eastwood, Southend.

CLASS 3.—*First* : Hertfordshire Institute of Agriculture, Oaklands, St. Albans.

No further award was made in this class.

CLASS 4.—*First* : P. & J. Peacock, West View, Cottenham, Cambs.

Second : W. Seabrook & Sons, Ltd., The Nurseries, Boreham, Chelmsford.

CLASS 5.—*First* : R. C. Cole, The Bungalow, Over, Cambs.

Second : W. Lawrence Taylor, Galleywood, Chelmsford.

Reserve : Ernest Allen, Wistaria House, Somersham, Hunts.

H.C. : G. Burnett-Stuart, Manor Fruit Farm, Danbury, Chelmsford.

CLASS 6.—*First* : R. J. Burrell, Risby Place, Bury St. Edmunds.

Second : Carter & Blewitt, Ltd., Boxted, Colchester.

Reserve : Hubert Hailey, Delamere, Gt. Wymondley, Stevenage.

CLASS 7.—*First* : W. L. Taylor, Galleywood, Chelmsford.

Second : R. J. Burrell, Risby Place, Bury St. Edmunds.

Reserve : H. G. Evans, Pleyhill, Hatfield Peverel, Chelmsford.

H.C. : T. B. Douglas, Hatfield Peverel, Chelmsford.

H.C. : Carter & Blewitt, Boxted, Colchester.

CLASS 8.—Walter Lawrence, Fruit Farm, Ashdon, Saffron Walden.

Second : H. G. Evans, Pleyhill, Hatfield Peverel, Chelmsford.

Reserve : P. & J. Peacock, West View, Cottenham, Cambs.

H.C. : Carter & Blewitt, Boxted, Colchester.

GENERAL OBSERVATIONS.

We regret to say that the standard of excellence in the orchards and plantations entered in the competition was below our expectations. We are inclined to the belief that little, if any, improvement in the general standard of fruit production has taken place for a number of years. In the area concerned where some of the orchards competed in the 1925 competition there is certainly no marked progress in orchard management—the reverse is rather the case. We were surprised to find so many plantations in such unsatisfactory condition.

We would especially draw attention to the many neglected orchards that still remain in the Middlesex area. They can only be described as derelict and harbours of almost every known pest and disease.

In the whole of our tour of the various districts we could not avoid seeing many orchards and plantations that were beyond repair. Far too large an acreage has unfortunately gone past the renovation stage from an economical standpoint. How much of this is due to unwise undercropping is difficult to say, but there is considerable evidence that many years of intensive intercropping of fruit plantations has finally beaten the occupier.

We were very disappointed in the quality of the strawberry entries and feel sure that we were not seeing the best class strawberry production in these counties. With the prevailing facilities for obtaining true stocks for planting it is surprising that more attention is not given to this matter and also to the subsequent "rogueing" of the plants.

In all soft fruits this question of true strain is so apparent as to be the deciding factor between profitableness or otherwise of the plantation. The marked difference in merit of the various entries rested practically on not only the trueness to variety but also on the productiveness of the "strain."

Black currants in Suffolk were as good as any fruit met with in the competition, but it was a regrettable sight to see a huge dump of bushes grubbed up unpicked on one farm in Essex which the owner said he could not pick and market at the price which imported pulp was commanding at that time.

SYSTEMS OF PLANTING.

We are pleased to note a tendency to do away with the mixed fruit plantations. Labour and spraying difficulties, and manurial requirements for different fruits have led to a move in favour of, and quite rightly so, open plantations. We consider that the intercropping of newly planted trees is often false economy and the existing opinion that the bare apple

plantation leaves "too much waste land" is also a mistaken view.

Tractor cultivation has simplified and cheapened plantation work, and this, coupled with open land between the trees, has reduced hand labour to a minimum.

Land to be planted with apples, should, in our firm opinion, grow only apples—and if an intercrop is required in a permanent plant of apple trees that intercrop can best be *apples* on an early fruiting stock.

CULTIVATION, PESTS AND DISEASE CONTROL.

Generally speaking, soil management was excellent considering that climatic conditions had, in many instances, hindered a satisfactory tilth.

It was encouraging to find that more and stronger measures were being taken to control scab. Lime sulphur, before and after blossoming, and powder were general on the cleaner plantations.

We regret, however, to report that in many cases aphid attacks were badly controlled. There appeared a surprisingly marked degree of effectiveness in the various tar distillate washes in the control of aphid.

With few exceptions sawfly was a general pest in the plantations.

In the West Cambs area we would have liked to see some attempt made to remove the large numbers of mummied plums which were left on the trees. Brown rot was very severe in several of the plum plantations.

Throughout our inspection of the orchards and plantations growers fully realised the importance of producing better fruit, and where circumstances permitted, such operations as more thorough spraying and thinning were receiving closer attention, but, as already mentioned, we regret to see so many trees past the profitable stage.

In concluding our Report we wish to express our very best thanks to Mr. E. C. Boughton for his organisation of the judging arrangements and to Mr. E. J. Colthup for so kindly placing himself and his car at our disposal during the whole of the judging period.

ALEC. WHITING.

REPORT OF THE COUNCIL TO THE
ANNUAL GENERAL MEETING OF GOVERNORS
AND MEMBERS OF THE SOCIETY,

HELD AT THE

ROYAL AGRICULTURAL HALL, ISLINGTON, LONDON, N.,

On WEDNESDAY, December 9, 1931, at 2.30 p.m.

Membership.

1. The Council have to report that the list of Governors and Members has undergone the following changes since the Annual General Meeting on December 10, 1930:—18 new Governors (including 6 transferred from the list of Members under Bye-law 9), and 412 new Members have joined the Society, and 5 Members have been re-instated under Bye-law 14; whilst the deaths of 8 Life Governors, 14 Governors, 66 Life Members, and 207 Members have been reported. 11 Life Members and 17 Members have been struck off the books under Bye-law 12, owing to absence of addresses; 4 Governors and 97 Members under Bye-law 13, for arrears of subscription; 9 Governors and 480 Annual Members have resigned.

2. Since the last Annual Meeting the Council have lost by death three of their number—the Hon. Cecil T. Parker, Mr. H. P. Mortimer, and Mr. Frank P. Matthews.

3. The Hon. Cecil Parker joined the Society in 1876, and became a member of its Governing Body in 1881; he was elected a Vice-President in 1900, and, at the time of his death, was a Trustee, to which office he was appointed in 1915. He occupied the Presidential Chair in the last year of the war and took a prominent part in the work of the War Emergency Committee, and the Relief of Allies Committee. During his long association with the Society Mr. Parker occupied in turn almost all the offices open to a Member of Council in connection with the Annual Show, including that of Honorary Director, which he held from 1893 till 1898. On relinquishing this office he was presented by the Society with a piece of Silver and an illuminated address as a mark of appreciation of the able manner in which he had carried out his duties. He served on most of the Committees of the Council, and had been Chairman of the General Show Committee, the Veterinary Committee, and the Committee of Selection and General Purposes. He was also Chairman of the Special Committee which in 1900 reported on the Society's Show System.

4. Although Mr. Mortimer only joined the Council in 1928

as a representative of Cheshire, he was always much interested in the Society's affairs, and helped in a very practical manner the Shows of the Society in 1925 at Chester, and in 1930 at Manchester.

5. Mr. Frank P. Matthews joined the Society in 1919 and became a Member of its Council in 1922 as one of the representatives of the Division of London. He served on the Veterinary Committee of the Council and was one of its delegates to the Eleventh International Veterinary Congress held in London last year. As the senior partner of Messrs. John Thornton & Co., live stock auctioneers, Mr. Frank Matthews was well known to many Governors and Members, by whom his decease will be much regretted.

6. Another loss has to be recorded in the death, last October, of Mr. Thomas L. Aveling, who first became associated with the Society fifty-two years ago. He was elected to the Council on its reconstitution in 1905, as one of the representatives of Kent, and served on it and on the Finance, Implement and Showyard Works Committees until 1927, at the end of which year he decided not to seek re-election. As a mark of appreciation of the valuable services rendered by Mr. Aveling, more especially in the capacity of Finance Steward at the Annual Shows from 1907 to 1928, the Council elected him as an Honorary Life Governor of the Society.

7. Amongst other Governors and Members whose loss by death the Society has to deplore are His Grace the Duke of Somerset, K.B.E., C.B., C.M.G., Viscount Galway, Lord Melchett, Lord Savile, K.C.V.O., Lord Stanley of Alderley, K.C.M.G., Lord Wrexall, the Dowager Lady Burton, Lord Henry Bentinck, M.P., Lord Arthur Hill, Sir Hugh Bell, Bart., Captain Sir Charles Cust, Bart., G.C.V.O., C.B., C.M.G., Sir Ian Heathcoat-Amory, Bart., the Rev. Sir William Hyde-Parker, Bart., Sir Michael Lakin, Bart., the Right Hon. Sir F. G. Milner, Bart., Sir W. W. Portal, Bart., Sir John Shelley, Bart., Sir G. Vernon P. Wills, Bart., the Hon. Sir C. A. Parsons, K.C.B., F.R.S., Miss Rosalie B. Babcock, Mr. Walter Dunn, Mr. James W. Glover, Mr. F. W. Griffin, Colonel H. H. Heywood-Lonsdale, D.S.O., Mr. S. B. Joel, Mr. Reginald B. Loder, Mr. Primrose McConnell, Mr. Hugh Morrison, Mr. Eustace E. Palmer, Mr. Douglas T. Thring, Mr. William Toogood, Mr. John Warne, Mr. Edmond Whinnerah, Vice-Admiral H. D. Wilkin, C.B.E., D.S.O., Mr. A. G. Wood and Mr. George Wood.

Numbers on Register.

8. These and other changes bring the total number of Governors and Members on the Register to 10,456, divided as follows :—

- 153 Life Governors ;
- 255 Annual Governors ;
- 1,834 Life Members ;
- 8,198 Annual Members ;
- 16 Honorary Members ;

10,456 Total number of Governors and Members, as against a total of 10,940 on the Register at the time of the last Annual Report.

Presidency.

9. The Council have decided to recommend to the Annual Meeting the election of Lord Mildmay of Flete, as President of the Society to hold office until the Annual Meeting in 1932.

Changes in the Council.

10. Since the last Annual Meeting Sir Arthur Hazlerigg, Bart., has been elected a Trustee, Sir Merrik Burrell, Bart., a Vice-President, and the following have been elected to fill vacancies on the Council in the representation of the Divisions named : Major F. H. T. Jervoise (Hampshire), Mr. E. E. Barclay (Hertfordshire), Sir J. F. Shelley, Bart. (Devon), Mr. Walter R. Burrell (Sussex), and the Hon. Edward Greenall (Cheshire).

Elections to the Council.

11. Members of Council retiring under the scheme of rotation at the forthcoming Annual Meeting are those representing the electoral districts of Group B, consisting of Buckinghamshire, Devon, Durham, Essex, Herefordshire, Leicestershire, London, Nottinghamshire, Rutland, Shropshire, Suffolk, Surrey, Wiltshire, Yorks (West Riding), and South Wales. Governors and Members registered in those districts have been communicated with, and the usual measures are being taken for the election or re-election of representatives for the Divisions concerned.

An election is also taking place in the Division of Warwickshire, which, owing to its increased membership, is now entitled to elect one additional representative.

Council Meetings in 1932.

12. The Council have fixed the following dates for their meetings in 1932 : February 3, March 2, April 6, May 4, June 1, July 6 (in Southampton showyard), July 27, November 2, December 7.

Accounts.

13. In compliance with the Bye-laws, the Council beg formally to submit the balance-sheet, with Receipts and Payments for the year 1930. These Accounts were published in Vol. 91 of the JOURNAL issued to Governors and Members this year,

having been certified as correct by the Professional Accountants and Auditors appointed by the Members. Copies of the Accounts will be available for reference at the Meeting on December 9.

New Editor of "Journal."

14. The Council have appointed Professor J. A. Scott Watson, Sibthorpe Professor of Rural Economy in the University of Oxford, as Editor of the Society's JOURNAL, in succession to Mr. C. J. B. Macdonald, whose death was recorded in the last Annual Report.

Consulting Engineer.

15. The appointment of Mr. B. J. Owen as Consulting Engineer to the Society was terminated by the Council as and from the 15th May last. Mr. S. J. Wright, the Deputy Director of the Institute of Agricultural Engineering at Oxford, thereupon accepted appointment in a temporary capacity until after the Warwick Show. He undertook the tests of the new implements entered for the Silver Medal and prepared a most useful report for the Judges, in addition to supervising the Machinery-in-Motion and engines in operation at the Show.

16. The Council have now appointed him to the position of Consulting Engineer and he is engaged upon the tests and observations of those machines entered for the Medal which at Warwick were deferred for further consideration.

Warwick Show.

17. Certain changes were introduced in connection with the Show this year, which was held from July 7 to 11 in the Castle Park at Warwick. Hitherto, Judges in all the breeding classes of live stock have started their duties at 9 a.m. At Warwick—except in a few of the larger sections—judging did not begin until 10 o'clock. By adopting a different type of "double-row" shedding for Cattle exhibits a saving in cost of erection was effected, which made it possible for the entry-fees payable by exhibitors to be reduced. The following alterations were also made at the show: (1) Admission charge on the Friday reduced from 3s. to 2s. 6d.; (2) Children under 14 years of age admitted to all parts of the Show at half-price; (3) Garage charges reduced to 3s. per car for the first four days, and to 2s. for the last day; Garage Season Ticket reduced to 10s.

18. For the most part excellent weather prevailed during the Show. In the Implement yard there were fewer stands, but entries of live stock were up to the average.

19. With the outbreak of Foot and Mouth disease in the north of England on June 17, and the "stand-still" Order which was put into force two days later, it appeared doubtful whether it would be possible to hold an exhibition of livestock at Warwick.

Fortunately, the Ministry of Agriculture was able to modify the Order at the beginning of July, but the restrictions remaining prevented many animals which had been entered from going to Warwick. Nevertheless, in most sections there was a representative exhibit.

20. Judging had scarcely been completed on July 7 when the Secretary was informed by the Ministry that Foot and Mouth disease had been confirmed at West Wycombe, Bucks., and that any cattle, goats, sheep and pigs which had come from within a 15-mile radius of the infected place would have to be removed from the Show and placed in isolation. About 100 animals were involved, and arrangements were made for emergency shedding to be erected outside the actual show area. This shedding was completed during the night of July 7-8, and by the morning all the animals concerned, with their attendants, were transferred to isolation quarters, where they remained until Monday, the 20th July. Other exhibits of cattle, etc., were allowed to be moved to their destinations at the end of the Show by licence from the Ministry.

21. The Council, at their meeting on July 29, appointed a Sub-Committee to interview the Minister of Agriculture, to urge upon him again the desirability of allowing animals from an infected area to be returned at once to exhibitors' own premises in that area in the event of a similar occurrence at any future Show.

22. H.R.H. The Prince of Wales favoured the Show with a visit on the Wednesday, having travelled by air from Sunningdale to the Warwick Racecourse, where he was received by the Mayor (the Countess of Warwick). He lunched with the Council and members of the Local Committee, saw the Parade of Cattle and judging of Hunters, and inspected several of the Implement Stands in the yard.

23. During the five days the visitors passing the turnstiles numbered 72,259.

Cattle from Certified and Grade A (T.T.) Herds.

24. At Warwick Show, for the first time, separate accommodation was provided for exhibits of Cattle from Certified and Grade A (Tuberculin Tested) licensed herds in accordance with the requirements of the Ministry of Health.

Young Farmers' Cattle Judging.

25. Facilities were again given for the holding in the Society's showyard of the International Dairy Cattle Judging Championship Competition organised by the National Association of Young Farmers' Clubs. On this occasion teams competed representing the United States of America, Northern Ireland and

England and Wales. The team from the United States this year succeeded in winning the Gold Challenge Cup.

Exhibits of Implements.

26. Suggestions have been made to the Implement Committee that in future exhibits of the same category should, as far as possible, be staged together in the showyard, and that all "new implements" entered for the Society's Silver Medal should be grouped under one roof. The whole question is under consideration, and, before any decision is reached for or against a change, it is proposed that the Secretary should attend the Machinery Show in Paris early in 1932, and report upon the arrangement of implements, etc., at that exhibition.

Plantations and Estate Nurseries.

27. Restricted to Shropshire, Staffordshire, Cheshire, and Lancashire (excluding the Furness and Ulverston Division), the Plantations and Estate Nurseries Competition this year attracted only 14 entries. The Royal English Arboricultural Society's Gold Medal for the best Plantation was awarded to the Earl of Powis. The Silver Gilt Medal (first prize) in the class for the best-managed Woodlands on an estate of not less than 1,000 acres was won by Mr. E. B. Hall, Hales Estate, Shropshire.

28. Kent, Surrey and Sussex will, under existing arrangements, comprise the area of next year's Competition.

Orchards and Fruit Plantations.

29. This Competition in 1931 was confined to an area including the counties of Cambridge (excluding Isle of Ely), Suffolk, Essex, Huntingdon, Bedford, Hertford and Middlesex. Thirty-six entries were made in the eight classes. The Special Medal offered by the Society for the entry receiving the highest number of points was awarded to W. Lawrence Taylor, Galleywood, Chelmsford.

30. It is suggested that Cornwall, Devon, Somerset, Dorset, Wiltshire, Hampshire and Isle of Wight shall be the area for next year's competition.

Awards for Long Service.

31. Long Service Medals and Certificates were again offered for farm servants, but on this occasion the area was not restricted, awards being extended to the whole of England and Wales. Claims on behalf of farm servants for consideration in connection with these awards must be made through County Agricultural Societies before the end of the year.

Show at Southampton in 1932.

32. As mentioned in the last Report, the Society's Ninety-first Annual Exhibition will be held at Stoneham Park, Southampton, from Tuesday, July 5, to Saturday, July 9, 1932.

Prize List.

33. The Prize List for the 1932 Show will, with certain alterations, be similar to that for the Warwick Show. Offers of Champion and other prizes have been received from the following :—Shire Horse Society, Clydesdale Horse Society, Suffolk Horse Society, British Percheron Horse Society, Hunters' Improvement and National Light Horse Breeding Society, National Pony Society, Shorthorn Society, Hereford Herd Book Society, Devon Cattle Breeders' Society, Sussex Herd Book Society, Sussex Cattle Breeders' Society of South Africa, Welsh Black Cattle Society, Longhorn Cattle Society, Aberdeen-Angus Cattle Society, English Aberdeen-Angus Cattle Association, Argentine Aberdeen-Angus Association, Dun and Belted Galloway Cattle Breeders' Association, Galloway Cattle Society, Dairy Shorthorn Association, Lincolnshire Red Shorthorn Association, South Devon Herd Book Society, Red Poll Cattle Society, Blue Albion Cattle Society, British Friesian Cattle Society, Ayrshire Cattle Herd Book Society, English Guernsey Cattle Society, English Jersey Cattle Society, British Kerry Cattle Society, Dexter Cattle Society, Oxford Down Sheep Breeders' Association, Shropshire Sheep Breeders' Association, Southdown Sheep Society, Hampshire Down Sheep Breeders' Association, Suffolk Sheep Society, Dorset Down Sheep Breeders' Association, Dorset Horn Sheep Breeders' Association, Wiltshire or Western Horn Sheep Society, Ryeland Flock Book Society, Kerry Hill (Wales) Flock Book Society, Clun Forest Sheep Breeders' Association, Lincoln Longwool Sheep Breeders' Association, Leicester Sheep Breeders' Association, Society of Border Leicester Sheep Breeders, Wensleydale Longwool Sheep Breeders' Association, Kent or Romney Marsh Sheep Breeders' Association, South Devon Flock Book Association, Welsh Mountain Sheep Flock Book Society, Black Welsh Mountain Sheep Breeders' Association, National Pig Breeders' Association, Large Black Pig Society, Gloucestershire Old Spots Pig Society, Essex Pig Society, National Long White Lop-eared Pig Society.

Special Prizes are being offered in the Poultry section by the Croad Langshan Club, Sussex Poultry Club, Columbian Wyandotte Club, Buff Orpington Club, British Barnevelder Club, British Black Barnevelder Club and Welsummer Club.

Closing of Entries.

34. Intending exhibitors at Southampton are reminded that the final date for receiving entries of horses, cattle, goats, sheep, pigs and produce is MAY 20, and no substituted entries will be permitted. Entries of Poultry close on May 31.

Applications for space in the Implement, etc., Department must be made not later than March 21.

Entries of New Implements for the Society's Silver Medal must be made by March 1.

Schedules and entry forms will be ready for issue in the New Year. To prevent disappointment, Members are particularly requested to make early application.

Future Shows.

35. The Council have accepted a cordial invitation to hold the Show of 1933 at Derby.

36. As the result of negotiations still in progress, the Show of 1934 will, it is hoped, take place at Ipswich.

37. In June last a deputation from Newcastle-upon-Tyne, headed by the Lord Mayor, waited upon the Council to invite the Society to hold the Show at Newcastle in 1935. This invitation was unanimously accepted.

38. It was with great regret that the Council learned of the death, on July 27, of Alderman J. J. Gillespie, of Newcastle, one of the deputation in June, who was so prominently identified with the two previous Shows in Newcastle in 1923 and 1908.

British Judges at South American Shows.

39. At the request of the Argentine Rural Society, the Council appointed the following gentlemen to officiate as judges of livestock at the Palermo Show in September last :

Shorthorn Cattle.—Mr. K. P. MacGillivray, Kirkton, Bunchrew, Inverness-shire.

Hereford Cattle.—Captain R. S. de Q. Quincey, The Vern, Bodenham, Hereford.

Aberdeen-Angus Cattle.—Mr. A. D. Campbell, Stanstill, Wick, Scotland.

Mr. MacGillivray and Captain Quincey also judged Shorthorn and Hereford Cattle at the Monte Video Show of the Uruguayan Rural Association.

Chemical Department.

40. It can hardly be matter for surprise, considering the present condition of Agriculture, that the number of samples submitted by members for analysis has undergone some diminution. As against 157, the number in 1930, the figure stands, for 1931, at 107. Nevertheless, useful work has been done by the Chemical Committee, and notably in the matter of securing the better quality of barley-meal as supplied to the farmer, and in drawing attention to the need of insisting on the rigid exclusion of castor-oil bean and other harmful substances from feeding stuffs. The decision of the Advisory Committee of the Ministry of Agriculture has, there is good reason to know, been much influenced, in the matter of barley-meal requirements, by the action taken by this Society on the initiative of its Chemical Committee.

41. As regards the supply of feeding stuffs and fertilisers, the changes that have occurred in price have been to the advantage of the purchaser. The cheapening of these has not been very marked with feeding stuffs, but in the case of purely nitrogenous fertilisers such as sulphate of ammonia, cyanide, nitrate of soda, etc., there has occurred of late a very decided lowering of price. Sulphate of ammonia, for instance, which, early in the year, cost £9 10s. a ton, this price remaining so until July, then experienced a sudden fall, first to £6 10s. and later to as little as £5 10s. per ton. Other purely nitrogenous materials had to follow suit to some extent. Whether the causes which have led to this are of purely temporary nature or are likely to continue, it is impossible to say. But, if continued, it will certainly call for some readjustment of the accepted Compensation Tables for Unexhausted Manurial Value. Meantime the prices of phosphatic and potassic fertilisers have remained much as they were.

42. Special subjects which have occupied the attention of the Chemical Committee, in addition to barley-meal and castor-oil bean mentioned above, have been the recurrence of Chilean Tares of cyanogenetic nature, unsatisfactory features attaching to the sale of the class of linseed cake known as "expeller" brand—the presence of metallic iron in basic slag, and the high prices charged for certain condimentary foods.

Botanical Department.

43. Apart from the fact that there has been no further diminution in the number of enquiries received, a review of those dealt with in the Botanical Department shows a general resemblance to that of the previous year. The section of the work dealing with the fungoid diseases of plants has again shown a tendency to expand. But, as before, more than half of the enquiries were concerned with pests occurring in fruit plantations. Some of these were exceptionally serious possibly on account of the wet sunless conditions prevailing through so much of the season making the usual measures of control difficult to employ. The number of seed samples tested was about the normal. The majority was home grown and some contained too large a proportion of weed seeds. The growing interest in grass land problems led to an increased demand for the identification of grasses collected either from recently sown fields or from exceptional sites such as salt marshes and heaths.

Zoological Department.

44. The work of the Zoological Department during the year has presented remarkably few points of general interest. There was a good deal of frit-fly in winter oats and wheat, but the summer attacks of the various corn-flies were little complained of, and though there were reports of damage by thrips and eel-

worm later on, this was trifling in comparison with the harm done by weather conditions. Little was heard of turnip-fly—essentially a dry-weather pest. The most widespread injury to farm crops in general was due to such familiar pests as slugs and “leather-jacket.” Many fruit pests were reported, but they were for the most part sporadic, though some, like plum saw-fly, were more prevalent than usual. The egg-laying season of the winter-moth was unusually prolonged this year, lasting well into the spring. Several applications had reference to animal parasites, and many ticks from domestic animals in the Colonies were received for identification.

45. A grant of £100 has been made by the Society to the Leathersellers’ Company towards their Warble Fly Investigation.

Anti-Grey Squirrel Campaign.

46. The Council have given their support to the campaign which has been organised in this country against the Grey Squirrel. On behalf of the Society Sir Merrik Burrell was present at a conference called in May last by the Ministry of Agriculture. The following resolutions were then passed:

1. That this Conference is of opinion that the grey squirrel is a pest which causes extensive damage to agriculture and horticulture, that it is widespread and increasing in numbers, and that it is in the interests of agriculture and horticulture that all possible steps should be taken to bring to the public notice the damage caused by these animals and the importance of repressing them.

2. That this Conference asks the Ministry of Agriculture to issue an educational pamphlet giving the life history of, damage done by, and methods of destroying the grey squirrel and to send copies to the various organisations represented at the Conference, and also to all County Agricultural Committees, asking them immediately to take all steps within their power to encourage the destruction of this pest.

47. In compliance with the suggestion in the second resolution, the Ministry has issued Advisory Leaflet No. 58—“Grey Squirrels.”

Animal Diseases.

48. Returns for the first nine months of the year in connection with the notifiable diseases showed a decrease as regards Sheep Scab, Swine Fever, and Parasitic Mange, but there were more cases of Anthrax and Foot and Mouth disease than in the corresponding period of either of the preceding two years.

49. Of Foot and Mouth disease outbreaks occurred during January in Sussex and Bedfordshire, and during March in Staffordshire, Yorks—West Riding, and Lancashire. But the whole country had for a time been free of all restrictions when on June 17 the disease was confirmed on a number of premises in Lancashire, Cheshire and Westmorland, some of the affected animals being stated to be of Irish origin. Further outbreaks

followed in other northern counties of England as well as in Scotland. In fact, so serious did the position become that the Ministry of Agriculture, on June 19, issued a general standstill order for the whole country. Some sixty outbreaks occurred in England and Scotland between June 16 and the beginning of July, by which time, the disease being localised in Northern England and the Southern half of Scotland, the Ministry was in a position to modify the standstill order. Further outbreaks occurred at West Wycombe, Bucks, in July (the first being confirmed during the opening day of the Society's Warwick Show); in Bedfordshire, Huntingdonshire and Pembrokeshire during August; in Pembrokeshire, Carmarthenshire and Staffordshire during September; and in Huntingdonshire during October.

50. This disease has given more trouble this year than in 1929, but has been kept well under control—so much so that we are still the envy of all the continental nations in this respect. The serum treatment is still on trial and the results up to the present appear to warrant its continuance.

51. Glanders of the horse and Rabies of the dog have not recurred in this country, much to the benefit of mankind as well as to the animal species which are liable to infection from these two diseases. Tuberculosis is, as before, one of our greatest problems. Numerous instances have occurred during the year where owners have been penalised for not reporting suspected or even obvious cases, but farmers are gradually becoming educated on this point and it is hoped therefore that a reduction in the incidence of this disease will follow. On October 2 Sir John Gilmour (Minister of Agriculture) stated that the cattle population of England and Wales in June, 1931, was 5,849,776. In 1930 reports were made under the Tuberculosis Order 1925 on 15,008 premises containing 471,827 cattle. On these premises 177,425 cattle—or 3 per cent. of the total cattle population—were the subject of reports, and 12,760 cattle were slaughtered in pursuance of the Order, being 0.2 per cent. of the total cattle population.

52. The position in respect of some other diseases, particularly Johne's Disease, Mastitis, Contagious Abortion, and Red Worms, is not satisfactory. Johne's Disease is even getting worse in some areas and Mastitis is far more prevalent than is usually recognised. Better control of these serious diseases would prove so economical to the whole nation, and to the agricultural community in particular, that it is obvious that further investigation and intensive research into them is needed most urgently.

The recent formation of an Agricultural Research Council was welcomed by agriculturists and veterinarians alike.

53. Members of the Royal Agricultural Society have again

availed themselves of the opportunity to consult the respective professors of the Royal Veterinary College with respect to outbreaks of disease, especially with regard to contagious abortion—not only in cattle but also in sheep—and for advice concerning Johne's disease and mastitis. In several instances, too, surgical cases in cattle have been sent to the College for operation; one patient in particular, a well-known prize-winner, having a piece of steel removed from the stomach and afterwards making a good recovery.

Spahlinger Anti-Tuberculosis Bovine Vaccine.

54. Early in the year the Council had under consideration the question of carrying out a test of the Spahlinger Anti-Tuberculosis Bovine Vaccine. As, however, it was learned that the Government of Northern Ireland had concluded arrangements for a test of a much more comprehensive character than that contemplated by the Society, the Council decided not to proceed with their own scheme. With the consent of Sir Edward Archdale, Minister of Agriculture for Northern Ireland, and Mr. Spahlinger's representatives, Dr. Minett, Director of the Research Institute in Animal Pathology, will act as an observer of the test on behalf of the Royal Agricultural Society of England.

Sir Merrik Burrell carried through the difficult and prolonged negotiations with the parties concerned which ultimately led to this most satisfactory arrangement for the Society being concluded.

Bovine Tuberculosis.

55. A scheme for the eradication of bovine tuberculosis submitted to the Society by the National Veterinary Medical Association has been carefully considered. Although fully appreciating the desirability of eradicating the disease and the value of many of the suggestions in the scheme, the Council could not see their way to support it. The reasons for this decision were explained in a report adopted by the Council on July 29.

Veterinary Biological Products.

56. The question of the Standardisation and Control of Veterinary Biological Products has received the consideration of the Veterinary Committee, and representatives of the Committee, in May last, interviewed Dr. Addison, the Minister of Agriculture, in regard to it, and the possibility of legislative action being taken to deal with the matter.

Quarantine Station.

57. During the third year's operations, ending March 31 last, the following stock was exported to the Dominions and

Colonies named, after passing through the London Quarantine Station :

	<i>Cattle</i>	<i>Sheep</i>	<i>Pigs</i>	<i>Goats</i>	<i>Total.</i>
Antigua	2	—	—	—	2
Australia	79	72	7	—	158
Tasmania, via Australia	—	23	—	—	23
Gold Coast	—	—	6	2	8
Irish Free State . .	28	35	21	—	84
Palestine	3	—	—	—	3
South Africa	65	209	15	2	291
Southern Rhodesia .	27	—	—	—	27
Total, year ending March 31, 1931 .	204	339	49	4	596

58. Comparative figures for the two previous years are as follows :

Year ending—					
March 31, 1930 .	387	192	109	5	693
March 31, 1929 .	347	126	60	10	543

59. The total number of animals passing through the Station since its opening is :

<u>938</u>	<u>657</u>	<u>218</u>	<u>19</u>	<u>1,832</u>
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60. The total of 596 animals isolated in the Quarantine Station during the last financial year shows a decrease of nearly 100 animals, due chiefly to a lesser number being shipped to Australia.

61. Administration costs for the three years in question were :

	£	s.	d.
1930/31	1,465	1	5
1929/30	874	18	1
1928/29	1,010	13	4
	<u>£3,350</u>	<u>12</u>	<u>10</u>

62. The Empire Marketing Board has issued a White Paper (Cmd. 3914 of 1931), from which the following is extracted :

"The London Quarantine Station established in 1928 continues to facilitate the export of pedigree livestock from this country to the Empire overseas.

"The thanks of the Board are due to the Royal Agricultural Society of England for the economical and harmonious administration made possible by their efficient management of the Station."

63. In the six months of the fourth year, commencing April 1, 1931, i.e., between the closing of the last financial year and the end of September, the following stock have been exported through the Quarantine Station :

46th Period, commencing		
May 8	13 Cattle	
	6 Sheep	
	3 Pigs	
	<hr/>	
	22	South Africa.
47th Period, commencing		
July 16	22 Cattle	
	6 Sheep	
	1 Pig	
	<hr/>	
	29	South Africa.
48th Period (3 weeks), com-		
mencing August 5	6 Cattle	
	8 Sheep	
	6 Pigs	
	<hr/>	
	20	Irish Free State.
49th Period, commencing		
September 1	6 Sheep	Australia, for New Zealand.
	1 Bull	Palestine.
	<hr/>	
	7	
	<hr/>	

31 Cattle and 11 Sheep entered the Quarantine Station on October 8 for detention prior to shipment to South Africa, and a consignment of 5 Cattle and 3 Pigs will enter the Station on October 24, for subsequent shipment to Palestine.

64. The Station has again proved capable of accommodating all stock offered for export, and quarantine periods are fixed as far ahead as possible to avoid any possible delay in exportation.

65. The administration and general working of the Station continues to run smoothly. Advantage was taken of a slack period in the summer months to repaint the Station internally and externally. The work was done by the staff.

66. The Empire Marketing Board has reported that the salaries of the administration and maintenance staff are subject to the reduction applicable to the Civil Service owing to the passing of the Economy Act, and such salaries and wages have been reduced as from October 1.

67. Further slight amendments have been made to the quarantine regulations, and have been embodied in the re-prints.

68. The Irish Free State has decided to utilise the Quarantine Station again, in view of the series of outbreaks of Foot and Mouth disease during the past summer.

69. Canada and New Zealand still remain the two most important Dominions which have not taken advantage of the quarantine scheme. A small consignment of Sheep entered the Quarantine Station in September for Australia, with tranship-

ment to New Zealand, after a period of quarantine in the former Dominion.

70. The High Commissioner for New Zealand has asked the Society for full particulars of stock despatched to all destinations through the Quarantine Station since its inception, together with copies of photographs showing the internal structure and fittings of the Station, for the information of the Prime Minister of New Zealand. These have been supplied, and it is hoped that, as a result of the full information given as to safeguards, &c., coupled with first-hand knowledge gained by the Prime Minister on the occasion of his visit last year, this Dominion will at length decide to accept a scheme which has proved so beneficial, and at the same time secure, to the other Dominions, Colonies and Dependencies.

National Institute for Research in Dairying.

71. Enquiries from members who took advantage of the privilege of consulting the National Institute for Research in Dairying on dairy husbandry matters during the last year have covered a wide field. Numerous enquiries were received on the feeding of dairy cows, as a rule with particular reference to the choice of concentrate mixtures suitable for use along with the foods grown on the farm. The low market prices ruling for cereals have led many farmers to consider more carefully how such foods could be used to the best advantage in stock-feeding, and even wheat has been included in many mixtures. This cereal can profitably be used up to 20 per cent. of a mixture, provided it is given as a roughly ground meal, and a due proportion of a cake or meal rich in proteins is also included.

72. Queries were also received regarding the possibility of increasing the percentage of fat and solids-not-fat in milk. With reference to the fat percentage no system of feeding can be suggested which will cause a permanent increase if the cows are securing an adequate and balanced ration; slight temporary changes may be induced, but these may be in the direction of an increase or decrease according to the food, the period of lactation and the individuality of the cows. The solids-not-fat content of milk is receiving more attention than formerly, and it is now known that the milk of individual cows, and even the mixed milk of a group of cows, falls naturally below the 8.5 per cent. "standard" more frequently than was formerly thought to be the case. Up to the present no individual food nor method of feeding has been discovered which influences the solids-not-fat content of the milk.

73. The subject of mechanical milking continues to receive marked attention from many farmers, and the tests carried out at the Institute, under the auspices of the Royal Agricultural

Society and the Machinery Testing Committee of the Ministry of Agriculture, have enabled useful advice to be given.

74. The selection of suitable mixtures of foods for calf-rearing has also been the subject of frequent enquiries, particularly from farmers engaged in the sale of milk who wish to rear calves with the minimum of whole milk. The experiments carried out at the Institute during the last nine years in the use of dry meals, in place of liquid gruels, as whole milk substitutes, have placed this method of feeding on a sound practical basis, and advice on this subject has led to definite economies in calf-rearing.

75. Additional subjects on which enquiries were received were the suitability of particular breeds of cattle for special conditions, the use of lucerne on dairy farms, the making of stack silage and the equipment and methods which should be used in the efficient sterilisation of dairy utensils.

Butter Marking.

76. In the last Annual Report it was mentioned that the Council had decided to support an application by a Committee of the Royal Empire Society for a Butter Marking Order. The Council during the present year made a grant of £50 towards the cost of such application. In September a draft Order was laid before Parliament under which it will not be lawful to sell or expose for sale any imported butter unless it bears an indication of origin. The provisions will apply to all blends or mixtures which contain imported butter. The Order prescribes the form in which the butter is to be marked. Package butter is to have the country of origin in type one-twelfth of an inch in height; butter in bulk is to be labelled in type half an inch in height; and butter exposed for sale retail is to have a show ticket printed in letters half an inch in height.

77. The draft Order was tabled and upon the prorogation of Parliament became operative in so far that it cannot be amended by either House of Parliament.

Research Committee.

78. A résumé of the work carried out in 1930 under the auspices of the Committee is given in the last volume of the *Journal*. In that volume is also to be found the report of an experiment in the Seeding of Barley, with a Note on Seed Drills, by the Director of the Norfolk Agricultural Station. A report also appears of experiments, conducted for the Committee at the South-Eastern Agricultural College, to test the value of various Milk Products in Chicken-Rearing.

79. Further progress is being made with the investigation of Bovine Mastitis at the Research Institute in Animal Pathology.

80. Research in connection with the inoculation of Lucerne has been continued during the year by the Rothamsted Experimental Station. Messrs. Allen & Hanburys, Ltd., who now prepare the Lucerne Cultures for sale on a commercial basis, have this year sold enough to inoculate 6,500 acres of land. During the past four years in which the issue of cultures has taken place, the acreage under lucerne in England and Wales has been increased by 24.3 per cent. The area under lucerne in the midlands and southern counties has been increased by 57.9 per cent., and that in the south-western counties by 40 per cent. In these two areas lucerne is benefited by inoculation.

Attempts are being made to isolate more efficient strains of nodule bacteria, and the strain now issued is considerably more efficient than those normally found in our soil. By similar methods it is hoped to obtain efficient strains with which to inoculate other legumes such as peas or clover.

81. In view of the Society's visit to Southampton in 1932 the Research Committee have arranged for the conduct of some experiments in Hampshire, two of which are designed with the object of investigating the effect of sheep folding and other methods of maintaining fertility on light land, with particular reference to a corn-growing system. The growing of Lucerne and Sheep Breeding are the subjects of two other experiments undertaken in Hampshire.

82. At the Norfolk Agricultural Station a further investigation has been begun into the Economy of Sugar Beet Top Disposal on Arable Farms.

Agricultural Research Annual.

83. *Agricultural Research in 1930*, the sixth of the annual surveys of the results of agricultural research at home and abroad, has been prepared, and copies are being issued with the Annual Report. The volume is free to Governors and Members who apply for it, and it may be obtained by non-members from the Secretary, or from the Publisher (John Murray, 50A Albemarle Street, W.), 1s. 3d. post free. Copies of earlier volumes are still obtainable.

Medal for Research.

84. A Silver Medal and money or books to the value of £10 were again offered by the Research Committee this year for a monograph or essay giving evidence of original research on the part of the candidate on any agricultural subject, on any of the cognate agricultural sciences, or on agricultural economics. Candidates must reside in Great Britain or Ireland, and must not be more than 30 years of age. The last date for receiving monographs or essays was October 31. In last year's competition two medals were awarded—one to W. A. Jones, for an

essay on "Stubble Cleaning : its Influence on Weed Seeds" ; and the other to P. S. Hudson for an essay on " English Wheat Varieties."

Earthquake in New Zealand.

85. At their February Meeting the Council ordered the sending of a cablegram to Lord Bledisloe, Governor-General of New Zealand, expressing their deep concern on hearing of the terrible tragedy which had fallen on that country, and their sympathy with the agriculturists and other inhabitants. The following reply was received :

" Deeply appreciate kind message of sympathy. GOVERNOR-GENERAL."

Highland Society's Centenary Show.

86. The Highland and Agricultural Society of Scotland, on the occasion of their One Hundredth Show in Edinburgh last June, extended an official invitation to the President and other Officials of the R.A.S.E. to be present at the Show and at the National and Civic functions organised in connection therewith. It was a matter of regret to the President that he was unable to be present, and at the last moment the Secretary was prevented from attending owing to the position of Foot and Mouth disease in England, which at that time was jeopardising the holding of the Royal Show. Mr. Wm. Burkitt, Member of Council for Durham, and Steward of Dairying at the Show, agreed at short notice officially to represent the Society.

87. At the Meeting of Members in the showyard at Warwick a Resolution of congratulation on their Centenary Show was cordially adopted and ordered to be sent to the Highland and Agricultural Society of Scotland coupled with a sympathetic message owing to there being no Cattle, Sheep or Pigs at Edinburgh in consequence of Foot and Mouth disease restrictions, and best wishes for a successful result.

88. At the Council Meeting held just before the Meeting of Members a vote of thanks was passed to the Highland Society for their hospitality and kindness to the official representative of the R.A.S.E. at the Centenary Show.

Congratulations to Sir William Dampier.

89. The Council, in June last, had occasion to congratulate Sir William Dampier on the honour of Knighthood conferred upon him by His Majesty the King. Sir William (formerly Mr. W. C. D. Dampier-Whetham) has been a " Nominated " Member of the Council since 1921.

Visits to Foreign Agricultural Shows.

90. Sir Douglas Newton and Mr. Borlase Matthews attended in June the Agricultural Show at Hanover organised by the

German Agricultural Society, and at the Council Meeting on July 29 briefly described their impressions and made suggestions for the adoption at the Royal Show of some of the features in operation at the German National Show.

Representation on other Bodies.

91. During the year the following gentlemen have been appointed to represent the Society on the bodies named: The President (British Association for the Advancement of Science, Centenary Meeting in London); Sir Merrik Burrell (Lawes Agricultural Trust); Mr. William Burkitt (Empire Dairy Council); Sir Archibald Weigall (National Institute for Research in Dairying); Mr. B. J. Gates (Anti-Grey Squirrel Campaign); Sir William Dampier (Board of Electors to the Sibthorpian Professorship of Rural Economy at Oxford University); the Hon. Claud Biddulph (Royal Agricultural College).

The Society was represented by Sir Merrik Burrell and Colonel Garrett at a Conference called by the Minister of Transport to consider the new Highway Code.

Sir Merrik Burrell also attended and gave evidence before the Ministry of Agriculture Departmental Committee on Tied Cottages.

"Queen Victoria Gifts."

92. For the present year the Trustees of the "Queen Victoria Gifts" Fund have made a grant of £180 to the Royal Agricultural Benevolent Institution, to be devoted to gifts to candidates as below, the distribution in each class to be left until after the election to pensions by the Institution: *Male Candidates*—Six gifts of £10 each; *Married Couples*—Three gifts of £20 each; *Female Candidates*—Six gifts of £10 each.

Medals for Cattle Pathology.

93. In the annual examination for the Society's prizes held at the Royal Veterinary College, the Silver Medal was won by Mr. S. L. Hignett, South View, Pontesbury, Shrewsbury, and the Bronze Medal by Mr. A. G. Beynon, Ynyshafren, Ponthenry, Llanelly. The examination was conducted by the Professors of the College and comprised written and oral work in the diseases of cattle, sheep, and swine.

National Diploma in Agriculture.

94. Sixty-one candidates were successful in obtaining the National Diploma in Agriculture at the thirty-second Examination held this year at Leeds from April 9 to 16. See list on pages 412 and 413.

National Diploma in Dairying.

95. The thirty-sixth Annual Examination for the National Diploma in Dairying took place in September at the University

and British Dairy Institute, Reading, for English and Welsh students, and at the new Dairy School for Scotland, Auchincruive, for Scottish students. Fifty-two candidates were examined at the English centre, of whom twenty-six were awarded the Diploma—one with Honours; and forty-six presented themselves at the Scottish Centre, of whom nineteen obtained the Diploma. The names of the successful candidates are given on pages 416 and 417.

By Order of the Council,

T. B. TURNER,

Secretary.

16 Bedford Square,
London, W.C.1.

NATIONAL AGRICULTURAL EXAMINATION BOARD

*Appointed by the Royal Agricultural Society of England and the
Highland and Agricultural Society of Scotland.*

REPORT ON THE RESULTS OF THE THIRTY-SECOND EXAMINATION FOR THE NATIONAL DIPLOMA IN AGRICULTURE.

HELD AT LEEDS, APRIL 9 TO 16, 1931.

1. The Thirty-second Examination for the NATIONAL DIPLOMA IN AGRICULTURE was, by the courtesy of the authorities, held at the University of Leeds, from the 9th to the 16th April last.

2. The subjects of Examination were Practical Agriculture (two papers), Farm Machinery and Implements, Land Surveying and Farm Buildings, Agricultural Chemistry, Agricultural Botany, Agricultural Book-keeping, Agricultural Zoology, and Veterinary Science and Hygiene. The whole nine papers could be taken at one time, or a group of any three, four or five in one year and the remaining group at one examination within the next two years. Candidates taking the whole Examination in one year who failed in not more than three subjects, and candidates taking a second group who failed in not more than two subjects, were allowed to appear again for those subjects only next year. Candidates failing in one or two subjects of a first group of not less than four, or in a single subject of a group of three, were permitted to take those subjects again in conjunction with the second group.

All candidates, before sitting for the Practical Agriculture and Farm Machinery and Implements papers, had to produce evidence of possessing a practical knowledge of Agriculture obtained by residence on a farm for a period or periods (not more than two) covering a complete year of farming operations.

3. The Examiners in the different subjects were :

PRACTICAL AGRICULTURE (First Paper, 400 Marks. Second Paper, 400 Marks) R. H. Evans, B.Sc., J. R. Bond, M.B.E., M.Sc., N.D.A. (Hons.), and Prof. J. A. Scott Watson, M.C., B.Sc., M.S.A. (Iowa); FARM MACHINERY AND IMPLEMENTS (300 Marks) Prof. R. Stanfield, M.Inst.C.E.; LAND SURVEYING AND FARM BUILDINGS (100 Marks) Robert Cobb, F.S.I.; AGRICULTURAL CHEMISTRY (200 Marks) S. Allinson Woodhead, D.Sc., F.I.C.; AGRICULTURAL BOTANY (200 Marks) Prof. Montagu Drummond, M.A., F.L.S., F.R.S.E.; AGRICULTURAL BOOK-KEEPING (200 Marks) James Wyllie, B.Sc., N.D.A. (Hons.), N.D.D.; AGRICULTURAL ZOOLOGY (100 Marks) Prof. James Ritchie, M.A., D.Sc.; and VETERINARY SCIENCE AND HYGIENE (200 Marks) O. Charnock Bradley, M.D., D.Sc., M.R.C.V.S.

4. One hundred and sixty-two candidates presented themselves, as compared with 146 last year. Twelve candidates took the whole Examination, 79 who had previously passed in certain subjects appeared for the remaining portion, and the other 71 candidates came up for a first group of subjects.

5. The following 61 candidates were awarded the Diploma :

JOHN BETT, Edinburgh and East of Scotland College of Agriculture.
ANDREW NOBLE BLACK, West of Scotland Agricultural College, Glasgow.

RICHARD WILLIAM BRIMACOMBE, South-Eastern Agricultural College, Wye, Kent.

JAMES STEVENSON BROWN, Edinburgh and East of Scotland College of Agriculture.

ROBERT HUGH BROWNE, Midland Agricultural College, Sutton Bonington, Loughborough.

DAVID ROBERT BROWNING, University of Reading.

JOHN BURGESS, Seale Hayne Agricultural College, Newton Abbot, Devon.

COLIN HARRISON CAMPBELL, West of Scotland Agricultural College.

DOUGLAS CAMPBELL, West of Scotland Agricultural College.

ARTHUR EDWARD CASEMENT, Edinburgh and East of Scotland College of Agriculture.

PATRICK CONROY, Royal College of Science, Dublin.

DAVID EVAN DAVIES, University College, Bangor.

THOMAS DAWSON, Armstrong College, Newcastle-on-Tyne.

HENRY SAXELBY DYER, Seale Hayne Agricultural College.

DEREK LESLIE EDMUNDS, University of Reading.

ROGER BERTHOLD FERRO, University of Leeds.

JOHN CLIFFORD FLETCHER, South-Eastern Agricultural College.

JOHN ELSTON FOX, University of Leeds.

NORAH OAKES FREETH, University of Reading.

CLEMENT PATRICK GAMAN, Harper Adams Agricultural College, Newport, Shropshire.

• ALBERT GANE, Harper Adams Agricultural College.

GORDON GEORGE GREGORY, University of Reading, and Seale Hayne, Agricultural College.
ROLAND PRITCHETT HALE, Armstrong College.
EDWIN HUMPHREY HINTON, East Anglian Institute of Agriculture, Chelmsford.
HENRY THOMAS HORSMAN, South-Eastern Agricultural College.
LESLIE EDWARD HUGHES, Harper Adams Agricultural College.
HARRY NEIL JACOBS, University of Reading.
ALFRED CHARLES JENKINS, Seale Hayne Agricultural College.
ARTHUR FRANK JOHNSON, University of Leeds.
JAMES BENJAMIN PHILLIPS JONES, University College, Aberystwyth.
JAMES KIRKBRIDE, Armstrong College.
JOHN IRVINE LITTLEWOOD, University of Leeds.
NEIL FRANK MCCANN, Harper Adams Agricultural College.
WALTER KNOX MACFARLANE, University of Glasgow and West of Scotland Agricultural College.
ALASDAIR HUGH MACKINNON, West of Scotland Agricultural College.
DUNCAN MACDOUGALL MACLIVER, West of Scotland Agricultural College.
ALEXANDER CAMPBELL McMILLAN, West of Scotland Agricultural College.
ALEXANDER GIBSON MALCOLM, West of Scotland Agricultural College.
WILLIAM BARKER MITCHELL, Armstrong College.
THOMAS MURDOCH, West of Scotland Agricultural College.
HUGH VICTOR NEWBY, East Anglian Institute of Agriculture.
JOHN ALAN NEWSTEAD, East Anglian Institute of Agriculture.
WILLIAM HOSKEN PARKER, Harper Adams Agricultural College.
JAMES STEEL PATERSON, West of Scotland Agricultural College.
JOHN BAILLIE PATERSON, West of Scotland Agricultural College.
OSMOND JOHN PATTISON, Armstrong College.
CECIL JOHN POPE, Midland Agricultural College.
DONALD EDWIN RALPH, University College, Aberystwyth.
EDWARD FRANK ROBERTS, University of Reading.
JAMES ENGELBERT ROWE, University of Reading.
OSBERT H. C. ROWE, University of Leeds.
JAMES SIMPSON, West of Scotland Agricultural College.
CLIFFORD GEORGE SMITH, University of Reading.
WILLIAM FREDERICK SPENCER, University of Reading.
WILLIAM PARK STRANG, University of Reading.
WILFRED ARTHUR TAYLOR, University of Leeds.
JAMES MURRAY THOMSON, West of Scotland Agricultural College.
THOMAS LESLIE VONDY, University of Leeds.
THOMAS GODFREY WALTON, Armstrong College.
RAYMOND HERBERT WEEKS, University of Reading.
ROBERT WILLIAM WOODS, Seale Hayne Agricultural College.

No candidate obtained the Diploma with Honours on this occasion.

6. Four of the candidates appearing for the whole Examination failed in not more than three subjects, and 14 of those taking a second group of subjects failed in not more than two. These will be permitted next year to take again the subjects in which they failed. One candidate retired from the Examination after the first day owing to illness.

7. Of the 71 candidates appearing for a first group of subjects, the following 30 succeeded in passing, and will therefore be per-

mitted, subject to the Regulations, to take the second group in 1932 or 1933 :

GEORGE BARTRAM, Midland Agricultural College.
 ARTHUR FAIRHURST BLACKBURN, University of Leeds.
 CHARLES JOHNSTONE BRYDEN, West of Scotland Agricultural College.
 WILLIAM J. T. CURTIS, Midland Agricultural College.
 WILLIAM ELLISON, Armstrong College.
 WILLIAM JOHN ENGLAND, University of Reading.
 JAMES WILLIAM FELL, Armstrong College.
 FRANCIS GERARD GILLET, Harper Adams Agricultural College.
 THOMAS GOSS, Seale Hayne Agricultural College.
 ALICE MAUD GROVE, East Anglian Institute of Agriculture.
 ALBERT MAIN HARRISON, South-Eastern Agricultural College.
 ERIC VINCENT KNIGHT, South-Eastern Agricultural College.
 CECILIA M. E. P. LLOYD, Harper Adams Agricultural College.
 LEO JOHN MCHARDY, University College, Aberystwyth.
 DONALD AUSTIN MCKENZIE, University of Glasgow, and West of Scotland Agricultural College.
 IAN STEWART MACKENZIE, Edinburgh and East of Scotland College of Agriculture.
 CYRIL GEORGE MORTIMER, University of Leeds.
 JOHN CARLISLE NOWELL, South-Eastern Agricultural College.
 MUNJANATHGOWDA BHEEMANGOWDA PATIL, Midland Agricultural College, and Seale Hayne Agricultural College.
 GEOFFREY WILLIAM POPE, Midland Agricultural College.
 ROBERT RENFREW, West of Scotland Agricultural College.
 JOHN CLIFFORD SAVILLE, Midland Agricultural College.
 FRANK H. S. STEPHENSON, Midland Agricultural College.
 JOHN DRUMMOND TALLANTIRE, University of Leeds.
 PHILIP LACE TEARE, West of Scotland Agricultural College.
 JOHN THACKER, Harper Adams Agricultural College.
 THOMAS COX WATERMAN, Seale Hayne Agricultural College.
 WESLEY WEIGHTMAN, Armstrong College.
 JOHN WEIR, West of Scotland Agricultural College.
 JOHN ATHELSTAN WYATT, Seale Hayne Agricultural College.

8. Twenty-nine of the unsuccessful candidates sitting for a first group failed in one or two subjects, which they will be allowed to take again in conjunction with the second group in 1932 or 1933.

9. The thanks of the Board are again due to the authorities of the University of Leeds, for their liberality and courtesy in placing the Great Hall and other rooms of the University at the Board's disposal for the Examination ; and to the Examiners, for the care and attention they bestowed upon the written answers to the papers set, and upon the *viva-voce* examination.

F. J. CARRUTHERS,
Chairman.

16 Bedford Square, London, W.C.1.
April, 1931.

REPORT ON THE RESULTS OF THE
THIRTY-SIXTH EXAMINATION FOR THE
NATIONAL DIPLOMA IN DAIRYING, 1931.

1. The third Examination under the auspices of the recently constituted Board—and the Thirty-sixth Annual Examination for the National Diploma in Dairying—was, by the courtesy of the Authorities, held during September at The University and British Dairy Institute, Reading, for English and Welsh students, and at the new Dairy School for Scotland, Auchincruive, for Scottish students.

2. As a preliminary to the acceptance of an application for permission to enter for the Examination, a candidate was required to produce:—(1) A certificate testifying that he or she had attended a Diploma Course in the subjects of the Examination covering *two academic years* at an approved Dairy Training Institution; (2) Evidence that he or she had spent at least six months on an approved Dairy Farm and taken part in the work.

A candidate who had already taken a Degree in Agriculture of a British University or a Diploma in Agriculture recognised by the Board, could enter for the Examination after one year's subsequent training at an approved Dairy Training Institution, providing that such course included at least six months' training in practical dairy work, and that he or she had worked for at least six months on an approved Dairy Farm.

3. Under the regulations, a candidate who, having passed in the practical examination, failed in not more than two subjects of the written examination might, at the discretion of the Board, appear for those subjects in the following year. A candidate who failed in three or more subjects of the written examination, or in any part of the practical examination, failed in the whole examination.

4. The written Examination included papers on Dairy Farming, Dairy Hygiene, Principles of Dairying, Dairy Factory Management and Dairy Engineering, Chemistry and Physics, Dairy Bacteriology, and Dairy Bookkeeping. The Practical Examination comprised Hard-pressed, Blue-veined, and Soft Cheese-making, and Butter-making.

5. At both Centres the same Questions were answered by the candidates from September 3 to 5. The Practical Examination as well as the *viva voce* was conducted at the English Centre from September 7 to 10, and at the Scottish Centre from September 14 to 19.

6. Of the 52 candidates who presented themselves at the English Centre four had previously passed in Practical Work, and they were not re-examined in this portion. Twenty-six candi-

dates were successful in passing, one reaching the Honours standard. The names of the Diploma-winners are in alphabetical order :—

ENGLISH CENTRE.

Diploma with Honours.

MURIEL DAVIES, University College of Wales, Aberystwyth.

Diploma.

MARY B. ASHLEY, Lancs. C.C. Dairy School, Hutton, Preston.

DAVID ROBERT BROWNING, The University and British Dairy Institute, Reading.

DORA J. CORFIELD, University College, Aberystwyth.

CLAUDE DE CHAZAL, The University and British Dairy Institute, Reading.

GEORGE ELWYN DUNKERLEY, The University and British Dairy Institute, Reading.

MARY ESTCOURT-WEBB, The University and British Dairy Institute, Reading.

NORAH OAKES FREETH, The University and British Dairy Institute, Reading.

HILDA MARGARET HANCOCK, University College, Aberystwyth.

JEAN HARGREAVE INGHAM, Lancs. C.C. Dairy School, Hutton, Preston.

MAIR ELIZABETH JONES, University College, Aberystwyth.

JOAN ROSEMARY LIGHT, The University and British Dairy Institute, Reading.

KATE LLOYD, Midland Agricultural College, Sutton Bonington.

KATELEEN DAVEY MADDEVER, The University and British Dairy Institute, Reading.

VERA IVY MITCHEM, The University and British Dairy Institute, Reading.

GERTRUDE VIVIEN MOORE, The University and British Dairy Institute, Reading.

BEATRICE EMILY MILDRED NORTHEY, The University and British Dairy Institute, Reading.

MAY PARKINSON, The University and British Dairy Institute, Reading.

MARY PURCELL, East Anglian Institute of Agriculture, Chelmsford.

EDITH MARY ROBSON, Lancs. C.C. Dairy School, Hutton, Preston.

REGINALD SCOTT, Midland Agricultural College, Sutton Bonington.

SYLVIA MARY LOUISA SMITH, Midland Agricultural College, Sutton Bonington.

FRANCES MARY GILIAN TALLENTS, Midland Agricultural College, Sutton Bonington.

GEORGE FREDERICK THISTLETON, Midland Agricultural College, Sutton Bonington.

NOEL THOMPSON, East Anglian Institute of Agriculture, Chelmsford.

RAYMOND HERBERT WEEKS, The University and British Dairy Institute, Reading.

Eleven candidates failed in not more than two subjects, for which they will be allowed to reappear at next year's Examination, provided they are able to produce evidence of further training.

7. Forty-six candidates presented themselves at the Scottish Centre, of whom five were re-examined in Paper Work and

viva voce only. The nineteen candidates whose names are given below succeeded in passing the examination. No candidate attained to the Honours standard.

SCOTTISH CENTRE.

Diploma.

JAMES STEVENSON BROWN, Duloch Home Farm, Dunfermline.

JOHN BURGESS, 4 Ladysmith Road, Lipson, Plymouth.

COLIN HARRISON CAMPBELL, Auchlane, Castle Douglas.

JOHN WILLIAM EGDELL, Garden House, Belsay, Northumberland.

LILY M. H. FULTON, Boydston, Hurlford, Ayrshire.

JOHN IRVINE LITTLEWOOD, Barncliffe Hall Farm, Shelley, Huddersfield.

WALTER KNOX MACFARLANE, Deanston, Airdrie.

ALEXANDER CAMPBELL McMILLAN, Gateside Farm, Stewarton, Ayrshire.

ALEX. GIBSON MALCOLM, Davaar, Causewayhead, Stirling.

THOMAS COSSAR MARSHALL, 4 Borden Road, Jordanhill, Glasgow.

ISABEL WINIFRED MITCHELL, 7 Edgemont Gardens, Langside, Glasgow.

LOUIS A. P. PIERIS, Veyangoda, Ceylon.

ELSIE COOPER POLLOCK, L'Olivier, Union Street, Motherwell.

EDITH HELEN MAY SAVAGE, 18 Scott Street, Dalnair (West), Glasgow.

JAMES MURRAY THOMSON, 15 Whirlie Road, Crosslee, by Johnstone, Renfrewshire.

JEANIE M. WALLACE, West Drumlembie, Campbeltown.

JOHN WIGHT, 202 Brighton Street, Govan, Glasgow.

MOIRA S. WILSON, Kilnmaichlie, Ballindalloch.

ROBERT WILLIAM WOODS, "Parkview," Compton, Marlton, Paignton, Devon.

Sixteen candidates failed in not more than two subjects, for which, after further training, they will be permitted to reappear in 1932.

8. The Examiners at both Centres were: R. H. Evans, B.Sc. (*Dairy Farming, Dairy Hygiene, and Practical Butter-making*); William Lawson, M.B.E., N.D.A. (Hons.), C.D.A. (Glas.), N.D.D. (*Principles of Dairying, Dairy Factory Management and Dairy Engineering and Practical Cheese-making*); J. F. Tocher, D.Sc., F.I.C. (*Chemistry and Physics*); A. T. R. Mattick, B.Sc. (*Dairy Bacteriology*); H. W. Kersey (*Dairy Bookkeeping*).

F. J. CARRUTHERS, *Chairman.*

T. B. TURNER, *Secretary.*

16 Bedford Square, London, W.C.1.

September, 1931.

ANNUAL REPORT FOR 1931 OF THE PRINCIPAL OF THE ROYAL VETERINARY COLLEGE.

THE year 1931 has not been quite so satisfactory as 1930 from the point of view of the fight against the scheduled contagious diseases of farm stock. In the case of Foot and Mouth Disease the number of outbreaks has considerably increased as compared with 1930 and 1929, but is noticeably less than in 1928 and 1927. Reference was made in last year's Report to the experimental use of a protective serum for the animals in the immediate neighbourhood of infected beasts, and the result of the first year's work in this connection was encouraging. The method is being used as a matter of routine in outbreaks of this disease and appears to have proved of some benefit in preventing the spread of the infection.

Again there has been no reappearance of Glanders in horses, although it is to be noted that a fatal case of Glanders in man was reported in London a few months ago. This was a remarkable occurrence in view of the fact that no case of Glanders in horses had been confirmed in this country since 1928. In spite of the most stringent enquiries it has been found impossible to trace the origin of the infection.

It is also a matter for congratulation that, thanks to the Quarantine Regulations, the country is still free from Rabies. In fact, no case of this disease has occurred in England since 1922.

The campaign against Bovine Tuberculosis still continues, but the progress made is disappointing. Besides the annual loss to stockowners, estimated at over £2,000,000, the disease is the cause of a great deal of suffering among the human population of Great Britain. According to Dr. A. S. Griffith, who has carried out the most extensive work in this direction in this country, the following table represents his findings :

Variety of Tuberculosis	No. of Cases	Percentage of Cases Infected with Bovine type of Tubercle Bacillus		
		0-5 Years	5-15 Years	All Ages
Cervical Gland	133	84.0	51.5	48.9
Lupus	168	62.5	53.2	52.4
Scrofuloderma	59	50.0	43.2	35.6
Bone and Joint	541	29.4	18.6	18.7
Genito-Urinary	23	—	—	17.4
Meningitis	33	33.3	35.0	27.3
Pulmonary	795	—	—	2.6
Post-Mortem Cases	183	29.7	14.3	22.3

The foregoing figures relate to the *incidence* of the bovine infection, and not to the *mortality* in human beings, from this cause, and if these cases represent a fair sample of the total cases in the country the view that a large proportion of the tuberculous disease in children under 15 years of age is due to the bovine type of tubercle bacillus is, if anything, an understatement of the case.

A few cases of Anthrax have been reported in man, but the incidence of the disease in cattle is only slightly above that of last year.

The position in regard to Sheep Scab is again a favourable one, there being a decrease of 40 per cent. in the number of outbreaks as compared with 1930. The position is still more favourable when one compares 1931 with 1929 and 1928. Although Swine Fever has been the cause of serious loss to stock-owners, the figures are lower than for the past two years, and it must be borne in mind that 1929 and 1930 were particularly bad years.

STRONGYLE WORM INFECTION IN HORSES.

The large number of samples of horses' faeces which have been sent to the College laboratories for examination are indicative of the mischief caused amongst all classes of young stock by the strongyle worm parasites whose presence in any quantity produce anæmia, diarrhoea, a dull, staring coat, general unthriftiness, and all the symptoms of a "bad doer." The disease has been recognised for many years, especially in farm colts, upon which less scientific care is usually bestowed than is the case with hunter and thoroughbred foals, and it would appear from the proportion of enquiries which have reached the College during the past two years that the thoroughbred horse breeders have lately had an increasing amount of trouble from this cause. Although not previously alluded to in these Annual Reports, and not a scheduled disease, as the infection is generally recognised as one which is picked up from infected pastures, it is worthy of a word of warning, for so much of the future value of a colt depends upon a good and healthy early start.

It is a disease which is more prevalent in wet seasons, and not only can grazing on low-lying and marshy pastures be blamed, but the feeding of hay from these pastures is also a possible cause. In support of this statement it is worth noting that veterinary practitioners have observed these parasites to be present, in both embryo and adult forms, in the intestines of aged horses which have been for years at regular work in large town studs without ever having been turned out to grass.

Undoubtedly the produce of certain infected fields is to be blamed for the origin, and, as animals which are fed on them are probable carriers, in cases of infection both should be taken

in hand. The colts should without delay be removed from the infected pastures and placed under expert veterinary treatment, whilst the pastures should be treated with salt or lime and fed off (if that course is deemed necessary) by cattle or sheep; who are not, so far as one knows, susceptible as hosts to this particular worm.

Treatment may in some cases be somewhat tedious and have to be prolonged, especially in cases which have been neglected at the start, but in most instances the improvement is apparent in a few weeks; and it is astonishing to see what a difference takes place in the appearance and manner of the colt when further microscopic examination of the faeces reveals the numbers of worm ova present to be reduced to almost vanishing-point.

It is a source of gratification that Members of the Royal Agricultural Society are taking increasing advantage of their privileges of consulting the Staff of the Royal Veterinary College regarding their difficulties in the case of diseases of farm stock, and advice has been given on such diseases as contagious abortion, tuberculosis, sundry sheep and pig diseases, and suspected cases of poisoning of different kinds.

The following paragraphs and tables represent the position of this country regarding the Scheduled Contagious Diseases.

PARASITIC MANGE OF THE HORSE.

The year's statistics show 138 outbreaks with 237 animals attacked, as against 201 outbreaks with 300 animals attacked in 1930. These figures are very encouraging, especially when one takes into consideration the position a few years ago.

FOOT AND MOUTH DISEASE.

As stated above, the incidence of Foot and Mouth Disease has greatly increased as compared with last year and 1929, but the position is still more favourable than it was in 1928. In spite of the increase of outbreaks in Great Britain the following monthly tables of outbreaks in other countries will show that this country is still in a favourable position in regard to the occurrence of this disease.

Month	Great Britain	France	Germany	Holland	Belgium
January	2	347	2,869	536	131
February	—	500	1,734	409	134
March	3	607	1,553	354	88
April	—	344	1,704	336	95
May	—	258	1,552	741	43
June	60	798	1,139	488	19
July	9	2,356	1,219	1,132	8
August	16	1,484	1,248	1,796	7
September	6	1,023	2,031	2,909	9
October	1	1,212	2,883	2,327	33
November	—	1,084	4,134	679	22
December	—	865	4,350	251	23

TUBERCULOSIS.

The following table gives the number of animals slaughtered under the Tuberculosis Order of 1925.

Year.	Animals Slaughtered.
1927	17,381
1928	16,759
1929	15,532
1930	15,863
1931	18,603

SHEEP SCAB.

The following table shows approximately the numbers of officially confirmed outbreaks.

Year.	Number of Outbreaks.
1927	723
1928	744
1929	665
1930	479
1931	363

Again the above figures show a decided improvement on the previous year.

SWINE FEVER.

The figures for this year are still on the downward trend—only 2,026 outbreaks being reported from January 1 to December 31, 1931. They are, however, considerably lower than those for 1929.

Year.	Number of Outbreaks.
1927	1,794
1928	1,472
1929	2,981
1930	2,498
1931	2,026

ANTHRAX.

The figures are not so favourable in the case of this disease as in 1930, although below the average for the years 1927 to 1929 and less by nearly half those of 1926. The following table shows the actual figures for the past five years :

Year.	Outbreaks.	Number of Animals Attacked.
1927	425	497
1928	536	618
1929	439	529
1930	391	443
1931	466	517

It is greatly to be hoped that the present financial difficulties through which the Nation is passing will not necessitate any curtailment of research into Animal Diseases, as no other line of "Agricultural Research" is so likely to lead to the material saving of pecuniary losses to the farmers. It is no exaggeration to say that if some of the more serious diseases of domestic animals were better understood millions of pounds could be saved annually. The annual direct cost of controlling the "scheduled" diseases alone approximates half a million pounds a year. It may be better understood what a huge field for useful research exists if it is realised that Livestock and Livestock Products sold off the farms of Great Britain amount to about £200,000,000 per annum. The benefit from greater *prevention* of animal diseases would not be confined to Great Britain, but would extend throughout the Empire and the World generally.

FREDERICK T. G. HOBDAY.

Royal Veterinary College,
London, N.W.1.

ANNUAL REPORT FOR 1931 OF THE CONSULTING CHEMIST.

It can hardly be matter of surprise that, during a period marked by such difficulties as farmers have had to contend with, the number of samples submitted by Members, for analysis, has undergone a reduction. This has proved to be the case, and, as against the 157 samples sent in 1930, the number for 1931 has been 110 only. In addition to these were 18 samples of Cider analysed in connection with the Show of the Society at Warwick.

So far as the supply of Fertilisers and Feeding Stuffs to the farmer has been concerned the changes have been in the purchaser's favour. In the case of Feeding Stuffs the fall in price has been a more or less gradual one. Linseed Cake, *e.g.*, starting the year at £9 per ton, fell to £7 10s. in August, then rising, as usual, somewhat as the winter season came on. Cotton Cake has remained more constant, varying from £5 to £4 7s. 6d. per ton, and, though there have been fluctuations in such things as Wheat offals, Barley meal, Dried Grains, &c., the general tendency has been to a cheapening. With Fertilisers, however, the change has, in some cases, been of a rapid and startling nature. While, until July, normal prices were maintained, the

close of that month brought in a sudden fall in sulphate of ammonia, one which caused other nitrogenous materials of that class more or less to follow suit. Thus, from £9 10s. a ton, the price which had ruled for sulphate of ammonia since the beginning of the year, this suddenly fell in July to £6 10s. and later to £5 10s. a ton. Nitrate of Soda, £10 a ton up to July, was quoted in October at £7 18s., Nitrolim (Cyanamide) simultaneously going from £8 18s. to £6 5s. per ton, and Nitro-chalk from £9 7s. to £7 5s. a ton. Other nitrogenous materials and fertilisers containing nitrogen do not appear to have been materially affected, while Phosphoric acid and Potash have remained at the previous unit value figures. It is too early yet (November, 1931) to say how far these changes are likely to be of permanent nature and how far due to competition and financial considerations that will only have a temporary influence. From the returns it would appear that the consumption of Sulphate of Ammonia has undergone a decline of 8½ per cent. in Great Britain and Ireland, thus coming back to the level of 1925-8. Overproduction and accumulation of stocks on the Continent have caused severe competition and have compelled many producers of by-product Sulphate of Ammonia to close down. So it has come about that such an absurdly low figure as £5 10s. per ton was reached in July, though subsequently (October) this was raised to £6 5s. per ton. When farmers have no money, they can hardly, however, advantage themselves even of these exceptionally low prices.

Under such uncertain circumstances I have not found it desirable to recommend meantime any alteration in the Tables of Unexhausted Manurial Value, though, undoubtedly, this will have to be done should the lowered prices for nitrogen become at all stable.

BARLEY MEAL

In my last Annual Report (1930) I dealt exhaustively with two subjects to which attention was then being specially directed—(a) the quality of Barley meal, and (b) the occurrence of Castor-oil bean in feeding-stuffs. These have continued to demand notice, but, as regards Barley meal, it is satisfactory to be able to report that a settlement has practically been come to, although legal sanction has not, as yet, been given by the inclusion of the agreed terms in the Fertilisers and Feeding Stuffs Act, 1926. The outcome of the litigation to which reference was made in my report of last year was that the question as affecting the sale of Barley meal was, with other matters, referred to the Advisory Committee of the Ministry of Agriculture, and was gone into by them very carefully and thoroughly, representatives of the several interests concerned being called to

give evidence. The conclusion finally come to was to recommend that, in future, there be two classes or grades of Barley meal recognised, the first—to be called simply “Barley meal”—“the produce of grinding barley, as grown, containing not more than 4 per cent. of matter other than barley”; and a second, to be called “Barley meal Grade 2,” “the product of grinding barley, as grown, containing not more than 10 per cent. of matter other than barley.” Anything else is not to have the term “barley meal” applied to it, but must be sold as a compound meal and so requiring a statement of chemical analysis.

This decision is so far satisfactory in that it puts a limit on the amount of impurities that barley may have when it is to be ground into meal, though, as I have pointed out before, it is a very different thing to say when unground barley has 4, 5 or more per cent. of impurities, and to commit oneself to a statement as to what percentage of impurities is present *after* the barley has been ground into meal. Further, speaking for myself, I must say that I am averse to the term “barley meal” being applied at all, even with the qualification “Grade 2,” to a material containing anything up to 10 per cent. of matter that is not barley. I would have decidedly preferred that the term “Barley meal” be confined to what the practical agricultural analyst would “pass” generally as conforming to the description “pure,” meaning thereby the produce of grinding barley originally well-grown and of reasonable purity, he interpreting purity in the same way as he does when wheat meal and offals, maize meal, pea and bean meal, &c., are submitted. The Traders might, of course, say that this would be putting themselves in the hands of the analysts, but, after all, it must always be so, more or less, and an agricultural analyst of experience and common sense knows quite well when barley or other grain of reasonable purity has been used, and whether sufficient care has been taken to free the grain from the external impurities connected with its cultivation.

However, though all has not been gained that might have been, and, although the above recommendations are not, as yet, passed into law, they have been practically adopted already, and it is remarkable what an immediate effect the above action had on the quality of what has since been supplied to the farmer under the name “barley meal.” Speaking from my, necessarily limited, experience, I have not, as yet, once come across a sample described as “barley meal, Grade 2,” nor have I had an instance in which I have been able to report definitely upon a sample sold as “barley meal,” as, without doubt, falling outside the allowed limits. As will be shown later, even Persian barley—which was the kind concerned in the prosecution of

July, 1930—has markedly improved, and regulations regarding its acceptance have been adopted by the Trade.

All this strengthens me in the conviction I have long had, that if some leading body, such as the Ministry of Agriculture or the Royal Agricultural Society, will only—after seeking the best advice possible—take a firm stand and insist upon the purity of materials sold to the farmer, the requirements will soon be complied with by the Trade.

CASTOR-OIL BEAN IN FEEDING CAKES, &c.

The last remark leads me to take up again the second subject specially alluded to in my 1930 report. But, here, the same more or less satisfactory position recorded in the case of Barley meal, has not been reached as yet. Meantime, I have collected a good deal of information relative to trade practice in the matter of the presence of castor-oil bean in cargoes of seed and grain, and in cakes manufactured abroad and imported into this country, these coming for the most part to Liverpool. The elimination of castor-oil bean before seed or grain is crushed can, as I showed last year, be readily effected if sufficient care be taken. There is no valid reason for its occurrence, and, if firms who import and trade in feeding materials from abroad would only insist on its exclusion and refuse to take deliveries in which it occurs, the freedom of these from this very dangerous material would soon be effected. From information obtained by me, however, it would appear that a system of adjustment is practised when deliveries are found to contain castor. A scale of allowances has been drawn up by the Trade, according to which goods found to contain less than a certain percentage of castor are obliged to be taken by the buyer, though guaranteed to be free from it, and when the percentage goes above this, a certain allowance has to be made, until a figure is reached which shall permit entire rejection of the goods. I discussed last year the utter impossibility of determining quantitatively the castor seed present in a cake as indicative of what would occur even in a single bag, much less in a whole cargo consisting of many bags, or of saying whether such was safe to give to stock or not. The position I took up then has been abundantly justified by the records of cases of poisoning which have occurred through the occurrence of castor-oil bean, when this has been found, not necessarily throughout a whole delivery, but, it may be, in one or two bags only. This led me to advocate the insistence on the total exclusion of castor-oil bean and the rejection of any feeding material containing it, even in small quantities such as would bring it within the limits of the Trade agreement referred to above.

According to what I have since heard, the following is a

not uncommon practice where such cake is dealt with. If the price has fallen since the delivery was contracted for, a sample is sent to an analyst who—rightly or wrongly—is believed “always to find castor” and to have the cargo rejected on the strength of this; but if the price meantime has gone up, a sample is sent to an analyst who is generally reputed to report “castor free,” or else nothing more is said about it and it is passed on to the buyer. If any confusion results, this is put down, of course, to the analyst and his competence or otherwise to determine the amount, but, as I have pointed out, the fault does not lie here, though in face of what I have said, the statement of a percentage figure as applicable to anything but the small sample submitted, and which may in no way be representative of the whole bulk, is altogether misleading. For myself, I absolutely refuse to state castor in terms of the percentage present, and confine myself to saying whether in the sample submitted to me castor is present or is not. This means, doubtless, loss of work to the analyst who adopts this plan, but, of its being the right and proper action to take, I have no doubt whatever.

ADVISORY COMMITTEE.

The report of the Advisory Committee on Fertilisers and Feeding Stuffs, in addition to the recommendations as to Barley meal, deals with several other matters which were referred to it for its consideration. These arose from experience gained in the working of the Act, or from representations of Trade or other interests concerned. It says a great deal for the smooth working of the Act that these referred matters were so few in number, and, indeed, the greater number of them had originally been intentionally left over for later consideration after the Act had come into working order.

The principal matters, in addition to Barley meal, dealt with now are:—

- (a) citric solubility of Basic Slag;
- (b) feeding meat and bone products.

As regards (a) it was recommended that, in future, a guarantee of the amounts of Phosphoric acid and soluble Phosphoric acid, respectively, should be given.

Under (b) a differentiation into three separate classes was made, viz. :—

1. Feeding meat meal;
2. Feeding meat and bone meal;
3. Feeding bone meal.

These were severally defined and the analytical requirements for each decided upon.

I may say that I am in general agreement with the alterations made in this second report.

The report deals with other matters such as pea and bean meal, mill sweepings, waste products, &c., and with alterations of regulations concerning the kind and use of sieves, methods of sampling, &c.

The above will go towards improving an Act which has already shown itself to be a useful and a just one, and the fact that a permanent Advisory Committee exists, which will deal with fresh contingencies as they arise from time to time, constitutes a further advantage.

I take now, as is my usual practice, matters of interest arising directly from samples that I have examined during the year on behalf of Members of the Society.

A. FEEDING STUFFS.

1. *Linseed Cake.*

The price of good-quality Linseed cake has varied from £9 a ton to £7 10s. a ton with steady fluctuation. The quality, speaking generally, has been good, though I had occasion, in one instance, to point out the presence of cyanogenetic compounds which may, if care be not taken, do harm to young stock through prussic-acid poisoning; in another case mustard seed was found, and this is distinctly dangerous also.

An exception to the general experience as regards purity of Linseed cakes must be made in reference to a particular brand of cake made in India and shipped usually from Calcutta. This is known as "Expeller" or "screw-press" Linseed cake, and it is sent over, not in the usual form of cakes, but in "flakes." It was this class of cake that was concerned in the losses of stock referred to later under the head of Castor-oil bean, this seed having been found to be present. In yet another instance, where complaint was made of the loss of several lambs, though I did not find castor present, there was a quantity of metallic deposit or grit, consisting partly of oxide of iron, partly of metallic iron. This amounted to $2\frac{1}{2}$ per cent. in the cake itself, and it was reported to me that in the stomachs of the lambs that died a quantity of a brown deposit had been found. The purchaser, who had entered into a contract for a somewhat large supply of this cake, promptly cancelled the contract, on receiving my report.

2. *Cotton Cake.*

The price of this has undergone but little change, varying only from £5 to £4 10s. a ton. With one exception, where the cake was found to be rather "woolly" owing to insufficient

cleaning of the seed from attached fibre, the cakes were all found to be of good quality and pure. A sample described as "Peruvian Cotton cake" gave the following analysis:—

Moisture	9.81
Oil	6.46
¹ Albuminoids	35.00
Carbohydrates, &c.	32.22
Woody Fibre	10.52
² Mineral Matter	5.99
	<u>100.00</u>
¹ Containing Nitrogen	5.60
² Including Sand and Silica	13

This was pure and clean, being intermediate in quality between ordinary undecorticated cake and decorticated cake. The price was £7 12s. 6d. per ton.

3. *Barley.*

To pursue what has been already said as to recent improvement in Barley meal, the following mechanical analyses of samples of Persian Barley submitted to me in 1930 (June) and 1931 (July) respectively, will show how the Trade responded to the requirements put forward by the Advisory Committee of the Ministry of Agriculture.

	Persian Barley.	
	1930.	1931.
	June.	July.
Oats.	5	15
Wheat	2	2.05
Weed Seeds and Dirt	4	01.20
Barley	89	96.60
	<u>100</u>	<u>100.00</u>

The total impurities, accordingly, fell from 11 per cent. to 3.4 per cent. Further, the Trade issued the following as the base of future contracts:—

Feeding Stuffs Contract No. 10.

Barley Admixture Clause to read:—

"Any admixture of Wheat, Dari, Paddy, Rice, Millet and Oats over 3 per cent. and up to 6 per cent. to be allowed for by Sellers at half contract price, but any such admixture in excess of 6 per cent. to be allowed for at contract price. Any other admixture over 2 per cent. to be allowed for by Sellers at contract price. The Analysis to be made by the London Corn Trade Association or its duly appointed Analyst."

It was, it will be remembered, Persian Barley that figured in the action taken in July, 1930—by the Middlesex County

Council—and which primarily led to the recommendations of the Advisory Committee.

4. Oat Offals.

A sample sent me and sold under the name "Oat Feed" at the price of £4 10s. per ton delivered, gave the following analysis:—

Moisture	10.31
Carbohydrates, &c.	63.37
Fibre	19.93
¹ Mineral Matter	6.39
	<hr/>
	100.00

¹ Including Silica and Sand 5.29

This consisted practically of one-half ground Oats and one-half Oat husk. Ground Oats, it may be said, would contain about 10 per cent. of fibre. It proved to have come from the manufacture of a Patent Oat food, and was much too dear; it should have been sold as "Oat Refuse."

A double breach of the Fertilisers and Feeding Stuffs Act occurred here, inasmuch as (1) no analysis had been given with the sale, (2) there was no declaration of the presence of Oat husks.

5. Maize By-product.

By way of contrast to the foregoing, a sample was sent me of a material which was obtained from a local mill where maize was ground, it being the portion blown out during the process of grinding. The miller considered it to be nothing but husks and useless as food, and, as he would not sell it with a guarantee, he was ready to dispose of it as chaff. As a matter of fact, it was the habit to burn it; but my correspondent, thinking it might be useful to mix with other food, sent me a sample, which gave, on analysis, the following:—

Moisture	13.42
Oil	6.00
Albuminoids	8.00
Carbohydrates, &c.	60.51
Fibre	9.82
¹ Mineral Matter	2.16
	<hr/>
	100.00

Nitrogen 1.28
¹ Including Sand and Silica13

This showed the material to be far from useless, and, indeed, the amount of husk, though considerably more than in maize itself (which contains about 2.5 per cent.), was by no means excessive.

6. *Chilian Tares.*

After a considerable interval following my pointing out the dangerous character of some of the seeds comprising the article sold as Chilian Tares or Peas, a recurrence of this happened, a member from North Wales sending me a sample of what had been offered to him. These peas were, like the former lot, found to be highly cyanogenetic (forming prussic acid on fermentation).

7. *Castor-oil Bean.*

Mention has been made already of the difficulty attending the detection and estimation of Castor-oil bean in feeding materials, and of the ill consequences that may follow its presence. It will be of interest now to know that, after the legal decision referred to in my 1930 Annual Report (*JOURNAL, R.A.S.E.*, Vol. 91, p. 315), a settlement satisfactory to both purchasers in question was come to, compensation to the extent of £594 in one case and £75 in the other being paid in respect of the death or deterioration of live-stock fed on Linseed cake found to contain Castor-oil bean.

8. *Compound Meals of "Fancy" Nature.*

I have had occasion, in previous reports, to draw attention to there being constantly offered to stock-rearers, articles which can only be regarded as "fancy" ones and sold at "fancy" prices. The Feeding Stuffs Act requires that they be sold with a guaranteed analysis, but the question of price is not touched by the Act, and it is not unusual for these articles to have spice and other condimental ingredients added to them, or cod-liver oil, together with iron compounds, whereby it is maintained that the mineral requirements are provided and desirable "vitamins" supplied. One such was sent me by a Member for examination, it being sold under a fancy name, and with a guarantee of its containing Oil 16 per cent., Albuminoids 18 per cent., and Fibre 7 per cent. The price of this was 58s. per cwt.

The analysis was found to come up to the guarantee, and the component parts were linseed, soya bean, and rice meal with some ferrous carbonate and condiments. A price such as asked is out of all reason, so far as food value goes, and it may be pointed out that with such materials as mentioned there need be no fear of either "minerals" or "vitamins" being deficient.

But, so long as the analytical guarantee is kept to, there can be no remedy in respect of the high price charged, and people who *will* buy these expensive articles must take their chance.

9. Sugar-beet.

A member sent me samples of Sugar-beet grown from two different varieties of seed—A being German seed and B Dutch seed. The beets of A were short, rather globular ones, but with few fangs, while the B roots were longer and more spindly.

The analyses of these were :—

	A.	B.
Moisture	76.40 per cent.	71.55 per cent.
Sugar (cold water extract)	16.00 "	20.10 "
Sugar in juice	18.20 "	22.10 "
Specific Gravity of juice	1.0864	1.1024
Coefficient of purity	87.5 per cent.	92.1 per cent.

The Dutch variety, B, it will be seen, was considerably the richer in sugar content.

B. FERTILISERS.

There has been little to report as to these generally, beyond the very marked fall, in July, of the prices of certain nitrogenous salts and of which mention has been made.

1. Basic Slag.

In one instance, where a Member had purchased Basic Slag under a guarantee of its containing 40–42 per cent. of Phosphate (a wrong form of guarantee, it should be pointed out, inasmuch as the guarantee must be given in terms of Phosphoric acid), the original sample showed a small deficiency in phosphate, but, at the same time, there was 4.35 per cent. of metallic iron present. If allowance were made for this, the guarantee would have been satisfied, but, of course, a purchaser does not want to have metallic iron in place of Basic Slag.

2. Peruvian Guano.

I commented last year on the high quality of Peruvian Guano as then arriving. This has been maintained, as the following analysis will show :—

Moisture	21.84
¹ Organic Matter	49.33
² Phosphoric Acid	10.21
Lime	8.80
Magnesia, Alkalies, &c.	6.22
Insoluble Siliceous Matter	3.60
	<hr/>
	100.00
² Equal to Phosphate of Lime	22.30
¹ Containing Nitrogen	14.59
Equal to Ammonia	17.74
³ Containing Potash	2.62

The price also of Peruvian Guano has undergone some reduction of late, and the demand for this material, which is so much in favour with hop growers and fruit growers, is likely to increase.

C. MISCELLANEOUS.

1. Soil.

A deficiency of lime in soils sent to me for analysis continues to be a frequent feature. Such an instance is the following, the soil being one from a forest nursery in Westmorland.

The analytical results were :—

(Soil dried at 100° C.)	
Organic Matter and loss on heating	21.55
Oxide of Iron and Alumina	14.86
Lime . . . . .	.22
Magnesia . . . . .	.67
Potash . . . . .	.43
Soda . . . . .	.10
Phosphoric Acid . . . . .	.48
Sulphuric Acid . . . . .	.12
Insoluble Silicates and Sand	61.57
	<hr/>
	100.00
	<hr/>
Nitrogen . . . . .	.50

The soil was found to be acid in character and the amount of lime present was distinctly low.

The complaint had been made that the soil seemed to be worn out by continuous cropping, but, though there was the marked deficiency of lime referred to, in other respects the soil did not seem to be at all a poor one, for it possessed a plentiful amount of vegetable matter and nitrogen, while phosphoric acid and potash alike were in good supply. The deficiency in lime, however, was marked, and gave rise, no doubt, to the failure recorded.

2. Water.

The Softening of Hard Waters.

The question of dealing with waters of hard nature is frequently one of considerable difficulty, and, though there are many processes, some of them admirable in themselves when used under favourable circumstances, yet it should be pointed out that there is no softening system which is applicable under all the varying conditions that may occur, and when dealing with waters of varied composition. In each case the particular composition of the water in question has to be considered, and then the special process adapted to it to be applied, it may be with modifications. Thus, while a water, the hardness of which is practically due to carbonate of lime alone, can be readily and inexpensively softened by the use of lime or some lime process, yet if the water contain sulphate of lime as well, or this along with salts of magnesia, soda, &c., lime treatment alone will be ineffectual, and special methods of softening may be called for. Nor will these be the same in each case, for they would

require to be adapted to the particular circumstances. Some waters, indeed, may be so hard naturally [such an instance is here given (a)] that it would not pay to attempt to soften them, while, in other cases, the removal of lime, by certain processes where soda salts are made use of, may result merely in the replacement of lime by soda, leaving the water with as much matter in solution as before. An instance of this is also given (b).

(a) A water sent me from near Burton-on-Trent gave the following results :—

	Grains per Gallon.
Total Solid Residue	158.20
Lime	41.44
Magnesia	8.16
Sulphuric Acid	69.92
Chlorine	1.22

These figures show that the lime was present mainly as sulphate and not as carbonate, thus giving rise to "permanent" hardness. The total solid constituents are so high in amount and composed mainly of lime and magnesia salts, that any attempt to soften the water for farm or domestic use would be futile.

(b) This is the case of a water that had been drawn from a colliery-pumping, and which, because of its high contents of lime and other solids, had been subjected to a softening process, in one of which, I subsequently heard, the use of soda salts was the main agent. My analysis of the softened water showed :—

	Grains per Gallon.
Total Solid Residue	33.60
Oxidisable Organic Matter . . . . .	.24
Chlorine	8.33
Equal to Chloride of Sodium	13.73
Nitric Acid (as Nitrates) . . . . .	.26
Lime	1.00
Magnesia	2.88
Sulphuric Acid (as Sulphates)	6.86
Free Ammonia . . . . .	.004
Albuminoid Ammonia . . . . .	.005

Although but little lime was left, the removal of this by the use of soda salts merely resulted in the substitution of soda for lime—the total solids remaining somewhat high and the water being considerably charged with soda salts, as chlorides and sulphates chiefly.

In this particular case the water was required mainly for use on a stud farm where horses were bred, and such a water as this softened-one was, is, by reason of the comparative absence of lime and the presence of alkaline salts in quantity, far from a desirable one.

3. The Action of Soils upon Lead Pipes.

Another matter that has exercised my attention has been

the not infrequent complaint that has been made of the action of certain kinds of soil on lead pipes—more especially those laid in chalk and used for the conveyance of electric cables. In some cases it is the custom to encase the pipes in wood, fir wood being generally used, and researches made in America have shown that direct injury to lead pipes so encased may arise from a decomposition of the wood, giving rise to gaseous products of acid character which act upon the lead. But where pipes are not so closed in, it may also happen that lead pipes are attacked; but there appears to be comparatively little known as to how this is produced and in what classes of soil. I am accordingly setting on foot some enquiries on the subject, and am trying the effect which different soils have upon lead pipes.

The Chemical Department has further been concerned with matters regarding the importation of New Zealand cheese under the name "Cheddar," the classification of Cider, &c., while the proceedings of the Advisory Committee of the Ministry of Agriculture on the Fertilisers and Feeding Stuffs Act have been carefully watched.

During the year the retirement of Mr. H. Dent Brocklehurst, involving his resignation of the Chairmanship of the Chemical Committee, has to be much regretted, as he has throughout shown an active interest in the work. Mr. Fred Smith, who has long been a member of the Committee, has been selected as the new Chairman.

The following is a list of the samples submitted to me by Members during the twelve months, December 1, 1930, to November 30, 1931 :—

Linseed Cake	1
Cotton Cake and Meal	2
Compound Feeding Cakes and Meals	7
Soya Cake	1
Cereals, Offals, &c.	9
Silage	1
Hay	1
Basic Slag	3
Superphosphate	3
Compound Manures	17
Raw and Steamed Bones	3
Sulphate of Ammonia	1
Potash Materials	2
Shoddy, &c.	8
Lime, Chalk, &c.	5
Milk, Butter, &c.	6
Water	16
Soil	19
Miscellaneous	5

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ANNUAL REPORT FOR 1931 OF THE
BOTANIST.

THE falling off in the number of enquiries received in the Botanical Department, to which reference was made in the report for 1930, has not continued. For 1930 the number was 186 and for 1931 215. When the enquiries of the two years are compared they show, on the whole, a general resemblance. Fungoid diseases again account for a large proportion, and of these the diseases of fruit-trees still show a tendency to increase. This, however, is partially accounted for by an exceptionally severe attack of apple scab. Fewer cases of cereal diseases than usual were dealt with and most of these were due to "leaf-stripe" (*Helminthosporium*). The symptoms of this are less widely known than those of the commoner cereal diseases, which, though hardly represented in the annual list, were of about an average intensity. Cereals again figured sparsely amongst the general crop enquiries, though a fair number of grain samples were sent in for germination tests. The lack of interest in cereal-growing forms perhaps the most significant difference between the two years. Grassland enquiries were slightly less numerous than in the previous year, but more samples of seed mixtures were analysed than on any previous occasion. Enquiries regarding weeds and their extermination were of about the usual order of frequency.

Fungoid Diseases.—Attacks of the leaf-stripe disease (*Helminthosporium*) were very general during 1931. Plants of Abundance oats sent in in mid-May were exceptionally heavily infected and these were followed shortly afterwards by specimens of Bountiful, another un-named variety of oats, and Archer's barley. The extent of the infection suggested the more or less complete crippling of the crops, though there was the possibility that the death of the badly diseased plants might leave more room for the better development of their slightly infected or disease-free neighbours, with the result that the crop, so thinned, might still produce a yield of about the average. The disease has been under investigation for several years and it is now known to be seed-borne. Uncontaminated seed stocks are not easily obtainable, and as the presence of fungus on the grain cannot be detected with the same certainty as, for instance, smut, it should be treated with a fungicide before sowing, unless it is known that the seed was harvested from an uninfected crop. As efficient a dressing as any and one, moreover, easy to use is Ceresan, which should be dusted over the seed at the rate of two ounces per bushel.

Specimens of the finger and toe disease (*Plasmodiophora*) on

the roots of cauliflower were received in the late autumn, with the request that advice should be sent as to the best method for securing immunity from it in the future. So far heavy liming is the only reliable means of control.

This treatment is necessary for the seed beds as well as for the field carrying the crop. At transplanting time the roots of the young plants should be thoroughly examined, preferably before taking them to the field, and any showing signs of infection should be discarded.

One very satisfactory report was received of the behaviour of a Danish variety of swede known as "Bangholm, Herning B" on badly infected soil. The crop was at first believed to be disease free, the few nodules found being attributed to gall-weevil, but a microscopic examination revealed the presence of *Plasmodiophora*. This variety cannot yet be unreservedly recommended except for land which is undoubtedly liable to produce a badly diseased crop, for it is questionable whether its cropping capacity is as high as that of most English sorts.

For several years past reference has been made in the annual report to the prevalence of apple scab. More specimens of this disease on either the twigs, foliage or fruits of the apple are now sent in for examination than of any other fungus. This year its attacks have been exceptionally severe. The first specimen received this season was from an orchard which had been sprayed with carbokrimp in the winter and with lime sulphur before the blossoms opened, and again a fortnight later. The sender was consequently doubtful whether the symptoms appearing on the foliage could be those of scab.

The fungus generally secured a good hold early in the year and the usual spraying routine often failed to check it, owing to the unsatisfactory spraying conditions obtaining through so much of the summer. Further, in many districts the poor set of fruit made it seem hardly worth while to trouble much about the trees. Consequently the disease became rampant, and in some cases the resulting leaf-fall left the trees almost bare by the middle of August.

The strawberry disease again referred to in the reports of the two previous years has now become serious. Hitherto most of the specimens examined have been taken from garden beds. But this season two lots have been sent in from strawberry fields, one in Hampshire and the other in Cambridgeshire. In both cases the fields were carrying their first crop of fruit. The extent to which the disease was present was apparently not realized until ripening began, when the failure of the fruit to swell normally and the dwarfed appearance of the plants made it obvious. In the worse case it was estimated that 20 per cent. of the plants were infected. Both crops were of the variety Royal Sovereign.

but an additional trial planting of Oberschlesien had been made in Hampshire. This too went down to the disease and some 300 out of 500 plants had to be lifted and destroyed. The gaps left have, after an application of lime, been filled with fresh plants, and it remains to be seen whether they will, in turn, become infected. One of the disquieting features about the disease is that the runners from which one of these plantings was made were taken from "certified" fields. Where large quantities have to be purchased it would evidently be a wise policy to inspect the fields producing them, unless a definite guarantee can be obtained from the vendor that they are disease free.

Though several investigations are in progress it is still impossible either to say with any confidence what the disease is due to or to suggest methods of control. At present it seems clear that Royal Sovereign is particularly susceptible to its attacks and that none of the varieties suitable for cultivation in this country can be relied upon to escape infection.

Potato blight was again a difficult disease to keep under control. The weather conditions in early July led to the expectation of a severe epidemic. But, possibly on account of the low temperature, the attack at first was slight and it only began to become serious in August. In the interval spraying was often prevented by rain, and at this critical stage little or nothing could be done to check the progress of the disease. Judging from field observations in the Midlands and Eastern Counties the incidence of the attack was very irregular, for in some localities the haulm was killed early and in others the damage appeared to be slight. At lifting time, however, a large percentage of infected tubers was found even in the crops which had apparently remained comparatively disease-free. At this stage enquiries began to be received as to the best method of storing the crops, for it was then evident that with an under-average yield and considerable losses through disease better prices than usual should be secured.

It is useless to store tubers which have become infected, however slight the symptoms of the disease are. They are best marketed at once or used for feeding purposes before they decay further. The first step in storing them is to sort the crop as thoroughly as possible. Many slightly infected tubers will inevitably be overlooked. A second inspection should therefore be made before the clamps are earthed up. A light dusting of lime is often recommended, but it is doubtful whether it is of much value. Thorough ventilation is advisable, as this plays a part in preventing the spread of other organisms which attack any tissues already damaged by blight. Fortunately the weather during the main-crop lifting time was exceptionally fine and the tubers were consequently clamped under conditions which should tend to reduce storage losses to a minimum.

The list of diseases reported on during the season includes amongst others *Corticium solani*, causing a "damping off" disease of seedling cabbages; *Puccinia Pringsheimiana*, the "cluster cup" disease of gooseberries; *Puccinia Porri*, "leek-rust," and *Cronartium ribicola*, "black currant rust." Though none of these are rare, specimens have not hitherto been sent in to the Botanical Department. The most unusual fungus trouble was one of no economic importance. This was due to the stinkhorn, *Phallus impudicus*, which had effectively established itself in a member's garden. The fungus is common in woodlands during the autumn months, where, though often hidden by the undergrowth, its presence becomes obvious owing to its stench and to the buzzing of blue-bottle-like flies attracted to it. Some method of eradication was urgently required. The only suggestion that could be made was to keep a good look out for the fungus and gather it in the egg stage, when it is practically odourless, and then soak the soil on which it had appeared with a fungicide.

Grassland.—Enquiries on grassland problems for the most part centred round the constitution of seeds mixtures for either long temporary leys or permanent pastures. An unusual number (10) of samples of commercial mixtures were sorted out into their component species and reported on. These all showed a striking diminution in the number of species used and a general omission of grasses such as foxtail, which can rarely be established satisfactorily. On the whole they were satisfactory and the only general criticism that could be made was that too large a percentage of Italian rye grass had been included. The vigorous growth characteristic of this species can be relied upon to produce a heavy cut of herbage during the first season. But this is too often obtained at the expense of the more permanent species of grasses and clovers. The bottom grasses particularly, on which the production of a close sward depends so much, tend to die out in the dense shade resulting from too heavy a growth of Italian rye grass and red clover. The difficulty is intensified in wet seasons when the crop is liable to lodging. Samples of six home-designed prescriptions were separated out in a similar manner as a check on the seedsmen entrusted with compounding them. They were, with one exception, slight variants of the mixtures recommended in the Society's leaflet "Sowing down Land to Grass," 1923. The main modifications were the inclusion of grass species known to succeed locally and variations in the quantities of clovers included in the mixtures. Three of them showed a tendency to be over-generous with the seed of wild white clover. Not only is the seed small, for there are over three-quarters of a million in the pound, but the preliminary dressing of a phosphatic manure, generally used when putting land down

to grass, often results in a vigorous growth of this plant from seed already present in the ground.

One noteworthy feature was the lateness of the season, when some of these grass samples were received. Four were sent in about the middle of May, that is at a time when the weather conditions often make it inadvisable to sow seeds which are, on the whole, slow to germinate and difficult to get established.

Various individual species of grasses were identified and several interesting lots of herbage sorted out into their components. One of these was from a salt-marsh grazing on the Norfolk coast. It contained a small percentage of recognised agricultural grasses such as fine fescues, but the bulk of the herbage consisted of such plants as thrift and sea-lavender. To which of these the undoubted grazing value of the marsh was due could not be determined. Two others were typical of excessively sour grassland. One was from an upland Yorkshire pasture which carried little but creeping bent grass, the other from a heath on which the useless tormentil appeared to be the dominant species. The only possible method of improving the land in both cases is to apply a heavy dressing of lime. This, in time, should break up the superficial peaty layer and give the white clover, almost sure to be present if only in traces, an opportunity of rooting down and producing grazeable material.

Seed Testing.—The majority of the seed samples tested during the spring and the latter months of 1931 consisted of cereals showing obvious symptoms of bad conditions during the harvest. The value for seed purposes of weather-stained grain is difficult to appraise by eye except in cases where an appreciable percentage has already sprouted. A test is necessary before sowing unless the risk of using too small a quantity of germinable seed per acre is deliberately taken. A series of three barley samples which happened to be under test at the same time illustrated this point. Two which were badly discoloured showed a thoroughly satisfactory germinating capacity, and consequently no departure from the normal seed-rate was necessary. The third, little if any the worst in appearance, just failed to reach a 50 per cent. germination. Its proper use was for feeding purposes, for even had double the usual seed-rate been employed in order to make up for the defective germination there was a strong probability that a full plant would not be secured. Such a risk is not worth taking, for a malting sample of grain cannot be expected from a thin and patchy stand of barley.

Several of the samples of the 1930 crop of broad-red clover suffered from the defect of containing far too large a percentage of the seeds of white campion, cranesbill and wild carrot. It is impossible to clean clover seed adequately without using

machinery with which no ordinary farm can be equipped. In some districts seed-dealers will undertake the work, but where such facilities are not available it is probable that it is more economical to purchase than to produce seed. As it happened, the weed seeds present in these samples were those of plants easily got rid of during routine cultivation, but this is by no means the general rule. In fact, much of the increasing foulness of the land can be traced to the use of badly cleaned clover seed.

The seed samples of the 1931 crops so far examined have been none too satisfactory. It is probable that all of those sent in for examination were under suspicion and that the tests were only required to determine whether the purchase of a fresh seed stock was unavoidable. Most of them were abnormally damp and within three days the grains were mildewing badly in the germinating dishes. Only about one in four of the wheat samples could be unreservedly recommended for sowing. The phenomenon of delayed germination in winter oats was met with on three occasions. The appearance of the samples was consistent with a good germinating capacity, but in the first trial the average was only some 40 per cent. The figures could not be trusted and the trials were repeated at an interval of a fortnight, when the germinating capacity had risen to about 70 per cent.

One case indicating the necessity of interpreting the results obtained during seed-testing with great caution was provided by the failure of a crop of peas. The germinating capacity of the sample was 82 per cent. This figure included seeds which only sprouted feebly and it represented the maximum the sample was capable of under the more or less ideal conditions of the laboratory. Though this was known, the seed was sown as it happened under unfavourable conditions. The soil was somewhat heavy, rain fell soon after the drilling was completed and the soil remained water-saturated for some time after. The plant which was obtained was so thin that resowing was necessary. The failure was almost certainly due to the lack of a sufficient supply of air and the consequent death of all except the most vigorous and most favoured seedlings.

Crop Enquiries.—Early in the year several enquiries were made as to the likelihood of lucerne succeeding in districts where at present the crop is not grown and consequently no local information is available. Where there is a reasonable chance of its succeeding a preliminary trial is always advisable. In two cases, both in the south-west of England, this course was recommended, for though the rainfall was greater than that of the Eastern districts in which the crop can generally be grown successfully, the soil conditions as regards the lime-content and drainage were known to be favourable. The seed was inoculated

before sowing and in the autumn satisfactory reports as to the progress of the crops was received. One had grown so strongly that the question was asked whether it might not be utilised for sheep feeding. The suggestion was made that it would be better to cut over the crop lightly and leave the mowings on the soil.

Early in the summer an opportunity was taken to inspect some fields laid down three seasons previously with a mixture of lucerne and cocksfoot. The conditions for lucerne-growing are particularly favourable, for a soil of fair depth overlies chalk and the rainfall is only about 24 inches. A hay crop is taken early in the season and for the rest of the growing period the fields are heavily grazed. Up to the present the results are considered to be satisfactory. This method of handling the crop has the advantage that it does away with the intercultivation necessary to keep lucerne in a reasonably clean condition, but further experience is necessary to show how long it will stand under these conditions. The only other point of interest brought to light during 1931 in connection with this crop is that the crown-gall disease (*Urophlyctis*), hitherto believed to be confined to Huntingdonshire, Cambridgeshire and Kent, has appeared in Buckinghamshire in a district in which lucerne was not known to have been grown previously.

At the request of a member detailed information was provided on the subject of growing swede seed. The practice which was common a generation ago is even now, when seed production has become a highly specialised trade, well worth while. The simple process of selection involved gives from the beginning a stock of seed of great purity, and if persisted in for a few years may easily result in a strain which neighbouring growers will be anxious to obtain.

Weeds.—In view of the prevalence of unfavourable conditions for cleaning the land it was not surprising to find that the majority of weeds sent in for identification were those of arable land. In fact, out of some forty specimens only five were grassland weeds.

None of these weeds were of any particular interest, but there was a noticeable preponderance of plants characteristic of sour soils such as corn-marigold, sheep's sorrel and spurrey. Most specimens were accompanied by requests for information on simple methods of eradication. Unfortunately the use of weed-killing preparations such as copper sulphate or sodium chlorate is not always practicable, and in most cases the only recommendation that could be made was either to cultivate more thoroughly or to make changes in rotations to allow better opportunities for cleaning. Looking back on the weather conditions, it has to be admitted that much of this advice must have been valueless.

The grassland weeds were creeping and bulbous buttercups, rest-harrow and wild onion all occurring in fields sown down four or five years previously. They are all fairly typical heavy soil plants whose seeds were almost certainly present in the soil when the land was put down to grass. The partial failure of the grass species, which is so common at this period in the development of permanent grassland, had provided the weeds with an opportunity for vigorous growth. Rest-harrow if not over-abundant can be exterminated by stocking out the plants with a pick, and the buttercups often disappear after a dressing of sulphate of ammonia. Wild onions, however, seem to defy all methods of eradication. Probably the best course to adopt in each case was to plough the field out and resow, aiming in future at a series of long leys rather than permanent grassland.

Stock poisoning cases again provided some of the usual difficulties of finding the real source of the trouble. In two cases, one of sheep and one of pigs, swedes were considered to be responsible. There seemed no real evidence for this or again for the loss of a cow through grazing buttercups. But *Ranunculus accleratus*, the celery-leaved crowfoot, was almost certainly responsible for the death of two cows. This notoriously poisonous plant is not uncommon in moist situations. It is easily distinguished from other buttercups by the thick, juicy stems, the somewhat celery-like foliage and the small, pale yellow flowers which appear in June. The juice is said to be sufficiently acid to cause a blistering of the skin. Where it occurs, as for instance near the edges of ponds to which cattle have access, the formation of seed should be prevented and if practicable the plants themselves should be rooted out.

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ANNUAL REPORT FOR 1931 OF THE ZOOLOGIST.

INTRODUCTION.

THE insect pests of the past year have been for the most part of so ordinary a character that a long report does not appear to be called for. Most destruction has been wrought by perfectly familiar pests such as slugs, wireworm and leatherjacket, about which there is little new to be said. It is attempted below to give a brief review of the various crops and the creatures attacking them which have come under my notice, with

additional notes on points which seem to possess some special interest.

CEREALS.

In common with all farm crops Cereals suffered severely from slugs, and there were cases of total destruction by these pests. The cases of attack by the various corn-flies were almost all on winter crops, both frit-fly and wheat-bulb fly being apparently much less prevalent than usual in June. Winter wheat, however, was injured by frit-fly in many districts, the pest being generally traceable to rye grass in the preceding crop. A case less easily explained was an attack of frit-fly on winter oats. Since no frit-flies are present at the time of germination of the winter crops they cannot be directly infested. Frit-fly attack on winter wheat, however, is quite common, especially after rye grass, and it appears that the grubs in the rye grass stubble migrate to the germinating wheat plants. In the case of the infested winter oats it could only be conjectured that the attack arose from a certain amount of self-sown wheat which was present in the field.

Leather-jacket depredations necessitated re-sowing in some districts.

At harvest-time an unusual amount of thrips was reported, and the eel-worm disease causing "cockles" was very prevalent, but the disastrous effects of unfavourable weather prevented much attention being paid to these minor causes of loss.

ROOT AND VEGETABLE CROPS.

Every kind of vegetable crop was reported to be injured by slugs, and many crops were only saved by the use of paris green bait, which was very effective in some cases. Cut-worms were also troublesome. Of the common vegetable pests gall-weevil in cabbages, and carrot-fly were often complained of, but most of the others seemed to be less prevalent than usual. There was very little celery fly, for instance, and in some districts the familiar cabbage caterpillars were almost absent. In a few cases trouble was threatened by *Sitona* weevils in peas, and by turnip-fly, but rain came to the rescue and severe attacks were apparently rare. When turnip-fly was notified, it was generally on members of the cabbage tribe, the commonest species being *P. concinna*.

There was some destruction of germinating sugar-beet by the pygmy beetle. Mr. Wood reports good results against this pest by "pickling" the seed. He found that seed steeped for twenty minutes in 1 per cent. carbolic acid and 5 per cent. magnesium sulphate escaped attack by the beetle.

Among the vegetable pests more prevalent than usual was

pea-thrips, which was reported as doing injury in several districts.

FRUIT CROPS.

A list of the pests which occurred on fruit-trees and bushes during the past season would, as usual, be a long one, but it presents few points of special interest. Winter moth was noticeably prevalent, and the moths were observed climbing the trees at a later date than is generally the case. Apple blossom weevil, too, was often reported. Two pests not so familiar were Leopard moth, and the wood-boring beetle *Xyleborus dispar*. Gooseberry saw-fly was little in evidence, and aphids were as a rule not troublesome on trees which had been sprayed with tar distillates. It was disquieting, however, to hear reports of damage to trees by such spraying in a few cases.

FOREST TREES.

Several forestry pests were sent to me for identification, all more or less familiar insects. Cut-worms and the grubs of two different chafers (*Melolontha* and *Phyllopertha*) were doing harm in nurseries. *Chermes cooleyi* was reported on Douglas fir and *C. corticalis* on Weymouth pine, and there were cases of willow-midge. I received also various insects attacking timber, including death-watch beetles and the larch beetle *Tetropium gabrieli*.

The "witches broom" of the willow mentioned in previous reports and attributed to the mite *Eriophyes triradiatus* seems to be on the increase, and many willow trees in the neighbourhood of Cambridge are badly disfigured by it.

CROPS UNDER GLASS.

A few cases brought to my notice in this section are perhaps worth recording.

Pyrethum was found to be seriously injured by a spring-tail. In another case grubs of the summer chafer were found to be attacking the roots of the same plant. One would have expected its poisonous nature to render it fairly immune from insect pests.

Another case, quite new to me, was injury to cucumber leaves by the "cheese mite" (*Tyroglyphus longior*). This is one of the commonest mites on stored food products, but I never before met with it attacking growing vegetable tissue. It appears, however, that such attacks had been previously observed by Mr. Speyer at Cheshunt.

Glass-house pests form a very special section of Economic Entomology, and their control by routine fumigation and spraying has been brought to a high degree of efficiency, especially by the researches of the Glass House experimental laboratory at Cheshunt with the co-operation of the Royal Horticultural

Society. A recent development is of such interest that it ought to be more generally known.

A method of dealing with pests known as "biological control" has been greatly developed of late. It consists in finding the natural enemies of a pest and breeding them out intensively in the laboratory, and then liberating them in the infested area. It is most applicable to pests newly introduced into a country from abroad, for such introduced insects have left their own special enemies at home and are therefore vastly more destructive in the new country than they were in the old. In such a case, it is often possible to "control" the pest by introducing from the country of origin one or more of the creatures which preyed upon the pest at home and prevented it from doing excessive damage. An early example of this method—now quite a classic—was the case of the orange scale, *Icerya purchasi*, in California, which threatened to destroy the orange-growing industry last century. The scale was found to have been introduced from Australia, where various predacious insects kept it more or less in order. One of these insects—a ladybird, *Vedalia cardinalis*—was successfully established in the Californian orange orchards, and quickly accounted for the pest.

Now one of the most troublesome glass-house pests, especially on cucumbers and tomatoes, is a "white-fly" (*Aleurodes*), against which expensive fumigation is frequently necessary. In 1926, some of the white flies were found to be "parasitised." Some insect had inserted an egg into each, and the grub of the parasitic insect was developing at the expense of the white-fly, which of course perished. From these parasitised specimens emerged ichneumon flies (*sensulato*) which proved to be Chalcid wasps of the species *Encarsia formosa*. By supplying these parasites with an abundance of white-fly scales a large number of parasitised specimens were obtained. It was necessary to breed the fly at a specially high temperature to accelerate its increase, so that it might keep pace with the parasite, but this was easily arranged in the laboratory and a vast number of parasitised white-fly scales was the result. These, when introduced into an infested glass-house, give rise to *Encarsias*, which immediately attack the flies there present. Very remarkable results have been obtained, and it has even been observed that the parasite has been able to find its way on its own account into glass-houses three miles away from the one into which it was introduced. Parasitised white-fly scales are now obtainable in quantity from Cheshunt and from the Royal Horticultural Society, and growers all over the country have availed themselves of this chance of cheaply ridding their glass-houses of a formidable pest.

Members may perhaps be interested to know that the Imperial

Institute of Entomology has at Farnham Royal a laboratory entirely devoted to the breeding out of parasites for exportation to our colonies and dominions where various pests have obtained a footing.

ANIMAL PARASITES.

Samples of bees have been received with inquiries as to whether they are infested by the bee-mite, and various parasites of domestic animals have been sent for identification. These include a large number of ticks from cattle, horses and dogs from overseas.

Tick in Butter.

It is perhaps desirable to put on record here an incident that occurred in May last and gave rise to many wild statements in the public press, and entailed a considerable amount of correspondence. I have communicated the plain facts to many inquirers, and among others to the Minister of Health in the late Labour Government. Stated briefly, they are these.

At one of the Colleges in Cambridge a student in cutting a portion of butter came across an object of unpleasing appearance. Not being an entomologist, he classed it under the general denomination of "bug," and proceeded very naturally to discard it. His vis-à-vis, however, chanced to be studying entomology, and out of curiosity he retrieved the specimen and recognised it as no insect, but a tick. He took it to the Molteno Institute of Parasitology at Cambridge for further examination, and it eventually came into my hands. It proved to be a species of tick which is unknown in Europe, but has been found in various parts of Asia, and it proclaimed the butter to be of oriental origin and presumably Russian, since a large consignment of Russian butter had recently arrived in the Thames. Ticks are animal parasites, and some are known to be carriers of disease to domestic animals. This specimen was of course dead and harmless in this respect—still ticks of any kind are not desirable in butter, and are apt to give the impression of want of cleanliness in the dairy, though from my point of view the chief interest of the incident lay in the extraordinary chain of coincidences connected with it. In the first place it must very seldom happen that an object found in butter is critically examined. In the next, it might have proved to be any one of a hundred insects universally distributed and affording no information as to the region of origin, whereas it was an oriental tick. And in the third place, had it not been that ticks have been especially studied at Cambridge the species would have escaped recognition. It was these considerations which led me to mention the matter to the Botanical and Zoological Com-

mittee, though it was not included in my written report. It excited considerable interest, and the Chairman mentioned the incident at the Council meeting on the following day.

Warble-fly.

The Committee set up by the Leathersellers' Company are continuing the campaign which met with signal success in 1930, and I have attended its meetings on behalf of the Society. The report of the Committee for 1930 has probably been seen by most members, and the work of propaganda, experiment and demonstration has been continued and intensified during the past year, with the co-operation of a large number of county educational authorities. A few points of special interest have arisen. There is unanimity as to the efficiency of derris preparations against the warble grub, but continued experiment seems to show that the formula recommended hitherto—derris powder 1 lb., soft soap $\frac{1}{2}$ lb., water 1 gallon—is unnecessarily strong. No ill effects follow its use, but expense is of course reduced if less derris powder is employed, and experiments are proceeding to ascertain the degree of dilution which is effective.

There is an unfortunate impression among many farmers that they would not personally benefit by the eradication of the fly, though the advantage to the leather trade is obvious enough. No view could be more mistaken, for the loss of condition of the cattle and the reduction of the milk yield are probably even more important than the injury to the hides, serious as that is. The new grading of hides adopted last year by the National Federation of Hide and Skin Markets and the United Tanners' Federation is a very welcome innovation. Hitherto warbled hides had not been sold separately from sound hides, but the new grading calls special attention to the point. The grades now are :

First clear.
Second clear.
Third clear.

First warbled (up to 4 warbles).
Second warbled (up to 25 warbles).
Third warbled (over 25 warbles).

A trouble the campaign has been up against is the importation of warbled cattle from Ireland, and the danger of re-infection of districts in England which have been cleared of the fly. Much negotiation has taken place between the Committee and the authorities of both Northern Ireland and the Free State, and the sympathetic attitude of those who have been approached has been most gratifying. Indeed, in many parts of Ireland the campaign has been taken up with enthusiasm, and there is good hope that the difficulty will be overcome.

MISCELLANEOUS.

Two inquiries had reference to the interesting little "sand bees" which are familiar objects on gravel paths or on lawns

where the soil is sandy. A common species is of a noticeably golden hue. My correspondents feared some damage to the grass from their operations. They are, however, quite harmless, not giving rise to any grubs which will eat the grass roots but merely digging short vertical holes with a chamber at the bottom containing cells filled with honey and pollen in which the eggs of the bee develop. Each bee works on its own account—i.e., is not “social” like the honey bee—but there are generally a number present in the same path or lawn.

As far as my observation went there were remarkably few wasps in evidence last summer. Probably no one regretted their comparative scarcity, but it should not be forgotten that, though they are a nuisance when too numerous, their total extinction would be a calamity because of the vast numbers of insects they kill to provide food for their young.

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School of Agriculture,
Cambridge.

Royal Agricultural Society of England.

(Established May 9th, 1838, as the ENGLISH AGRICULTURAL SOCIETY, and incorporated by Royal Charter on March 26th, 1840)

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1921	COURTHOPE, Col. Sir G. L., Bart., M.C., M.P., <i>Whiligh (Sussex).</i>
1921	*DAMPIER, Sir W. C. D., Sc.D., F.R.S., <i>Upwater Lodge, Cambridge.</i>
1926	DUDGEON, Major CECIL R., <i>Oargen Holm, Dumfries (Scotland).</i>
1927	DUGDALE, Major W. MARSHALL, D.S.O., <i>Llwyn, Llanfyllin, Mont. (North Wales).</i>
1929	ELGIN, Earl of, C.M.G., <i>Broomhall, Dunfermline (Scotland).</i>

* Nominated Member of Council.

Year when
first elected
on Council.

Ordinary Members of the Council (continued).

1913	EVENS, JOHN, <i>Burton, Lincoln (Lincolnshire).</i>
1926	EVERARD, W. LINDSAY, M.P., <i>Ratcliffe Hall, Leicester (Leicestershire).</i>
1921	FENWICK, E. GUY, <i>North Luffenham Hall, Stamford (Rutland).</i>
1928	FORSHAW, THOMAS, <i>The Stud, Carlton-on-Trent, Newark (Nottinghamshire).</i>
1924	*GARRETT, Col. FRANK, C.B.E., <i>Aldringham House, Leiston (Suffolk).</i>
1922	GATES, B. J., <i>Pembury, Tring (Buckinghamshire).</i>
1916	GILBEY, Sir WALTER, Bart., <i>Elsenham Hall, Elsenham (Essex).</i>
1931	GLOSSOP, C. W. H., M.P., <i>Bramwith Hall, near Doncaster (Yorks., W. Riding).</i>
1931	GREENALL, Hon. EDWARD, <i>Walsham House, Melton Mowbray (Cheshire).</i>
1925	HALE, WINDHAM E., <i>Moubreck Hall, Kirkham (Lancashire).</i>
1925	HALL, J. HERBERT, <i>Hill House, Mobberley, Knutsford (Cheshire).</i>
1930	HANSFORD, Major C. C., <i>The Orchard, Thornbury, Bristol (Gloucestershire).</i>
1905	HARRIS, JOSEPH, <i>Brackenburgh Tower, Penrith (Cumberland).</i>
1926	HASTINGS, Lord, <i>Melton Constable Park (Norfolk).</i>
1905	HISCOCK, ARTHUR, <i>Manor France Farm, Stourpaine, Blandford (Dorset).</i>
1919	HOBBS, ROBERT, <i>Kelmscott, Lechlade, Glos. (Oxfordshire).</i>
1931	JERVOISE, Major F. H. T., <i>Herriard Park, Basingstoke (Hampshire).</i>
1923	JOHNSTONE, Capt. G. H., <i>Trewithen, Grampound Road (Cornwall).</i>
1931	MACINTOSH, Sir HAROLD, <i>Conyngham Hall, Knaresborough (Yorks., W. Riding).</i>
1909	MANSSELL, ALFRED, <i>College Hill, Shrewsbury (Shropshire).</i>
1928	MATTHEWS, R. BORLASE, <i>Greater Felcourt, East Grinstead (Surrey).</i>
1911	MYATT, JOHN, <i>Lincoln House, Shenstone, Lichfield (Staffordshire).</i>
1927	NEAME, THOMAS, <i>The Offices, Macknade, Faversham (Kent).</i>
1922	NEILSON, R. B., <i>Holmwood, Sandiway, Northwich (Cheshire).</i>
1922	NEWTON, Sir DOUGLAS, K.B.E., M.F., <i>Croxtan Park, St. Neots (Huntingdonshire).</i>
1915	OLIVER-BELLASIS, Capt. R., <i>Shilton House, Coventry (Warwickshire).</i>
1930	QUESTED, J. EGBERTON, <i>The Firs, Cheriton, Folkestone (Kent).</i>
1928	RADNOR, Earl of, <i>Longford Castle, Salisbury (Wiltshire).</i>
1924	*RANSOME, EDWARD C., <i>Highwood, Ipswich.</i>
1927	*RUSSELL, Sir JOHN, D.Sc., F.R.S., <i>Rothamsted Experimental Station, Harpenden, Herts.</i>
1923	SAMPLE, C. H., <i>26 St. Mary's Place, Newcastle-on-Tyne (Northumberland).</i>
1931	SHELLEY, Sir J. F., Bart., <i>Posbury House, Crediton (Devonshire).</i>
1930	SMITH, EUSTACE ABEL, <i>Longhills, Lincoln (Lincolnshire).</i>
1907	SMITH, FRED, <i>Deben Haugh, Woodbridge (Suffolk).</i>
1929	STANLEY, Lord, M.C., M.P., <i>Knowsley, Prescott (Lancashire).</i>
1912	STRACHIE, Lord, <i>Sutton Court, Pensford (Somerset).</i>
1929	STRAFFORD, Earl of, <i>Wrotham Park, Barnet (Middlesex).</i>
1923	TANNER, E. CRAIG, <i>Eyton-on-Severn, Worcester (Shropshire).</i>
1920	THORNTON, F. H., <i>Kingsthorpe Hall, Northampton (Northants).</i>
1930	TREOWEN, Maj.-Gen. Lord, C.B., C.M.G., <i>Llanarth Court, Raglan (Monmouthshire).</i>
1924	WAKEFIELD, JACOB, <i>Sedgwick House, Kendal (Westmorland).</i>
1926	WEBB, FRANK, <i>Billington Estate Office, Leighton Buzzard (Bedfordshire).</i>
1929	WEBB, S. OWEN, <i>Streetly Hall, West Wickham (Cambridgeshire).</i>
1925	WEIGALL, Lt.-Col. Sir ARCHIBALD G., K.C.M.G., <i>Englemere, Ascot (London).</i>
1931	WHEATLEY, Lt.-Col. C. J. H., <i>Berkswell Hall, Coventry (Warwickshire).</i>
1889	WHEELER, Col. E. VINCENT V., <i>Newnham Court, Tenbury (Worcs.).</i>
1918	WICKHAM-BOYNTON, T. L., <i>Burton Agnes Hall, Driffield (Yorks., E. Riding).</i>

* Nominated Member of Council.

STANDING COMMITTEES.

* * Under Bye-Law 73, the PRESIDENT is a Member *ex officio* of all Committees, and the TRUSTEES and VICE-PRESIDENTS are Members *ex officio* of all Standing Committees except the Committee of Selection and General Purposes.

The Honorary Director is a Member ex officio of all Committees.

Finance Committee.

ADEANE, C. (<i>Chairman</i>)	COURTHOPE, Sir G. L.	GREAVES, R. M.
DEVONSHIRE, Duke of	HAZLERIGG, Sir A.	HARRISON, W.
CORNWALLIS, Lord	ASHTON, T. W.	MANSELL, ALFRED
DARESBURY, Lord	BURKE, U. ROLAND	SMITH, E. A.
BURRELL, Sir MERRIK	CRUTCHLEY, PERCY	WHEELER, Col.

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CORNWALLIS, Lord	COURTHOPE, Sir G. L.	BROCKLEBANK, Rev.
(<i>Chairman</i>)	HAZLERIGG, Sir A.	C. H.
ELGIN, Earl of	DAMPIER, Sir W. C. D.	BURKITT, W.
RADNOR, Earl of	RUSSELL, Sir JOHN	MANSELL, ALFRED
MILDMAY OF FLETE, Lord	ADEANE, C.	NEAME, T.
BURRELL, Sir MERRIK		WHEELER, Col.

Chemical Committee.

SMITH, FRED (<i>Chairman</i>)	BURKITT, W.	OLIVER-BELLASIS,
HARLECH, Lord	GATES, B. J.	Capt. R.
DAMPIER, Sir W. C. D.	GREAVES, R. M.	QUESTED, J. E.
RUSSELL, Sir JOHN	HALE, W. E.	SAMPLE, C. H.
BROCKLEHURST, H. D.	NELSON, R. B.	

Botanical and Zoological (Forestry and Orchards) Committee.

HASTINGS, Lord	ASHTON, T. W.	DUGDALE, Major
(<i>Chairman</i>)	BENYON, H. A.	JERVOISE, Major
CORNWALLIS, Lord	BURRELL, WALTER R.	LE SUEUR, A. D. C.
TREOWEN, Lord	CHRISTY, Capt. H. A.	NEAME, T.
COURTHOPE, Sir G. L.	DALLIMORE, W.	WHEELER, Col.
HAZLERIGG, Sir A.		

Veterinary Committee.

BURRELL, Sir MERRIK	ASHTON, T. W.	GLOSSOP, C. W. H.
(<i>Chairman</i>)	BARCLAY, E. E.	HARRIS, JOSEPH
RADNOR, Earl of	BEHRENS, Major CLIVE	HOBDAY, Prof. F.T.G.
HASTINGS, Lord	BELL, JOHN	JOHNSTONE, Capt.
MILDMAY OF FLETE, Lord	BURKE, U. ROLAND	MANSELL, ALFRED
STRACHIE, Lord	BURRELL, WALTER R.	QUESTED, J. E.
GREENALL, Hon. EDWARD	BUXTON, Capt. H. G.	SMITH, FRED
COTTERELL, Sir JOHN	CRUTCHLEY, PERCY	STANYFORTH, Lt.-Col.
GILBERT, Sir WALTER	FENWICK, E. GUY	TANNER, E. C.
WEIGALL, Sir A. G.	GATES, B. J.	THORNTON, F. H.

Committee of Selection and General Purposes.

DARESBUY, Lord	HARLECH, Lord	GREAVES, R. M.
(Chairman)	COURTHOPE, Sir G. L.	WHEELER, Col.

THE PRESIDENT

And the Chairman of each of the Standing Committees.

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(Chairman)	RUSSELL, Sir JOHN	GREAVES, R. M.
RADNOR, Earl of	WEIGALL, Sir A. G.	MATTHEWS, R. B.
CORNWALLIS, Lord	ADEANE, C.	NEAME, T.
HASTINGS, Lord	BURKITT, W.	SMITH, FRED
BURRELL, Sir MERRIK	BURRELL, WALTER R.	WIGAN, Capt. D. G.

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DARESBUY, Lord	CRUTCHLEY, PERCY	QUESTED, J. E.
GREENALL, Hon. EDWARD	DUDGEON, Major C. R.	SMITH, FRED
BURRELL, Sir MERRIK	EVERARD, W. L.	TANNER, E. C.
COTTERELL, Sir JOHN	FENWICK, E. GUY	WEBB, FRANK
BARCLAY, E. E.	FORSHAW, T.	WEBB, S. OWEN
BEHRENS, Major CLIVE	GLOSSOP, C. W. H.	WICKHAM-BOYNTON,
BELL, JOHN	GREAVES, R. M.	T. L.
BROCKLEBANK, Rev. C. H.	HOBBS, ROBERT	The Stewards of Live
BURKE, U. ROLAND	MANSSELL, ALFRED	Stock
BURKITT, W.	MYATT, JOHN	

Judges Selection Committee.—Same as Stock Prizes Committee.

Implement Committee.

STANYFORTH, Lt.-Col.	CRUTCHLEY, PERCY	MYATT, JOHN
E. W. (Chairman)	EVENS, JOHN	RANSOME, E. C.
COURTHOPE, Sir G. L.	GARRETT, Col.	SAMPLE, C. H.
DAMPIER, Sir W. C. D.	GATES, B. J.	WEBB, S. OWEN
BURKE, U. ROLAND	GREAVES, R. M.	WHEELER, Col.
BURKITT, W.	HARRISON, W.	The Steward of
BUXTON, Capt. H. G.	MATTHEWS, R. B.	Implements

Showyard Works Committee.

BURKE, U. ROLAND	MACKINTOSH, Sir H.	HALL, J. H.
(Chairman)	ASHTON, T. W.	NEILSON, R. B.
DARESBUY, Lord	BELL, JOHN	SAMPLE, C. H.
GREENALL, Hon. EDWARD	BURKITT, W.	STANYFORTH, Lt.-Col.
BURRELL, Sir MERRIK	BURRELL, WALTER R.	WEBB, S. OWEN
HAZLERIGG, Sir A.	CRUTCHLEY, PERCY	WHEATLEY, Lt.-Col.

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STRACHIE, Lord	ASHTON, T. W.	OLIVER-BELLASIS,
BURRELL, Sir MERRIK	CRUTCHLEY, PERCY	Capt. R.
MACKINTOSH, Sir H.	EVENS, JOHN	WILLIAMS, Prof. R.
WEIGALL, Sir A. G.	GREAVES, R. M.	STENHOUSE

Horticultural Committee.

HAZLERIGG, Sir A. (*Chairman*) DARESURY, Lord BURKE, U. ROLAND

General Southampton Committee.

The Whole Council, with representatives of the Local Committee.

Honorary Director.—U. ROLAND BURKE.

Secretary.—T. B. TURNER, 16 Bedford Square, London, W.C.1.

Editor of Journal.—Prof. J. A. SCOTT WATSON, *School of Rural Economy, Oxford.*

Consulting Chemist.—Dr. J. AUGUSTUS VOELCKER, M.A., 1 Tudor St., E.C.4.

Consulting Veterinary Surgeon.—Prof. F. T. G. HOBDAV, C.M.G., F.R.C.V.S., *Royal Veterinary College, Camden Town, London, N.W.1.*

Botanist.—Prof. Sir R. H. BIFFEN, F.R.S., *School of Agriculture, Cambridge.*

Zoologist.—CECIL WARBURTON, M.A., *School of Agriculture, Cambridge.*

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Publisher.—JOHN MURRAY, 50A Albemarle Street, W.1.

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DISTRIBUTION OF GOVERNORS AND MEMBERS OF THE SOCIETY, AND OF ORDINARY MEMBERS OF THE COUNCIL.

ELECTORAL DISTRICT	DIVISION	NUMBER OF GOVERNORS AND MEMBERS	NUMBER OF ORDINARY MEMBERS OF COUNCIL	ORDINARY MEMBERS OF COUNCIL
A.	BEDFORDSHIRE	77	1	Frank Webb.
	CHESHIRE	530	3	Hon. Edward Greenall; J. H. Hall; E. B. Nelson.
	CORNWALL	81	1	Capt. G. H. Johnstone.
	DERBYSHIRE	238	1	U. Roland Burke.
	DORSET	101	1	Arthur Hiscock.
	HAMPSHIRE AND CHANNEL ISLANDS	298	2	T. W. Ashton; Major F. H. T. Jervoise.
	HERTFORDSHIRE	194	1	E. E. Barclay.
	LANCASHIRE AND ISLE OF MAN	391	2	Windham E. Hale; Lord Stanley.
	MIDDLESEX	70	1	Earl of Strafford.
	MONMOUTHSHIRE	82	1	Maj.-Gen. Lord Treowen.
	NORFOLK	314	2	Capt. H. G. Buxton; Lord Hastings.
	NORTHAMPTONSHIRE	192	1	F. H. Thornton.
	NORTHUMBERLAND	262	2	G. H. Sample.
	STAFFORDSHIRE	236	1	John Myatt.
	WORCESTERSHIRE	178	1	Col. E. V. V. Wheeler.
	YORKSHIRE, N.E.	256	2	Major Clive Behrens; John Bell.
	SCOTLAND	305	2	Major C. R. Dudgeon; Earl Elgin and Kincardine.
		—3,805	—25	
B.	BUCKINGHAMSHIRE	147	1	B. J. Gates.
	DEVON	187	1	Sir J. F. Shelley.
	DURHAM	189	1	W. Burkill.
	ESSEX	237	1	Sir Walter Gilbey.
	HEREFORDSHIRE	153	1	Sir John R. G. Cotterell.
	LEICESTERSHIRE	211	1	W. Lindsay Everard.
	LONDON	470	2	H. Dent Brocklehurst; Sir A. G. Weigall.
	NOTTINGHAMSHIRE	192	1	Thomas Forshaw.
	RUTLAND	41	1	E. Guy Fenwick.
	SHROPSHIRE	308	2	Alfred Mansell; E. Craig Tanner.
	SUFFOLK	233	1	Fred Smith.
	SURREY	199	1	R. Borlase Matthews.
	WILTSHIRE	178	1	Earl of Radnor.
	YORKSHIRE, W.E.	319	2	C. W. H. Glossop; Sir Harold Mackintosh.
	SOUTH WALES	108	1	Capt. H. A. Christy.
		—3,132	—18	
C.	BERKSHIRE	211	1	H. A. Benyon.
	CAMBRIDGESHIRE	177	1	S. Owen Webb.
	CUMBERLAND	147	1	Joseph Harris.
	GLAMORGAN	75	1	Hubert Alexander.
	GLOUCESTERSHIRE	288	1	Major C. C. Hansford.
	HUNTINGDONSHIRE	27	1	Sir Douglas Newton.
	KENT	328	2	Thomas Neame; J. E. Quested.
	LINCOLNSHIRE	302	2	John Evans; Eustace Abel Smith.
	OXFORDSHIRE	192	1	Robert Hobbs.
	SOMERSET	154	1	Lord Strachie.
	SUSSEX	342	2	Walter E. Burrell; Sir G. L. Courthope.
	WARWICKSHIRE	320	2	Capt. R. Oliver-Bellars; Lt.-Col. C. J. H. Wheatley.
	WESTMORLAND	89	1	Jacob Wakefield.
	YORKSHIRE, E.E.	119	1	T. L. Wickham-Boynton.
	IRELAND	67	1	Edward Bohane.
	NORTH WALES	262	1	Major W. Marshall Dugdale.
		—3,100	—20	
FOREIGN COUNTRIES		218		*Sir W. C. D. Dampier.
MEMBERS WITH NO ADDRESSES		18	4	*Col. Frank Garrett.
				*E. C. Ransome.
GRAND TOTALS		10,273	87	*Sir John Russell.

* Nominated Members of Council.

TABLE SHOWING THE NUMBER OF GOVERNORS AND MEMBERS
IN EACH YEAR FROM THE ESTABLISHMENT OF THE SOCIETY.

Year	President of the Year	Governors		Members			Total
		Life	Annual	Life	Annual	Honorary	
1839	3rd Earl Spencer	—	—	—	—	—	1,100
1840	5th Duke of Richmond	86	189	146	2,434	5	2,860
1841	Mr. Philip Pusey	91	219	231	2,407	7	4,595
1842	Mr. Henry Handley	101	211	328	3,194	15	5,849
1843	4th Earl of Hardwicke	94	209	429	3,155	15	5,902
1844	3rd Earl Spencer	95	214	442	3,161	15	6,927
1845	5th Duke of Richmond	94	198	527	5,899	15	6,733
1846	1st Viscount Portman	92	201	554	6,105	19	6,971
1847	6th Earl of Egmont	91	195	607	5,478	20	6,891
1848	2nd Earl of Yarborough	93	186	648	5,387	21	6,835
1849	3rd Earl of Chichester	89	178	582	4,643	20	5,512
1850	4th Marquis of Downshire	90	169	627	4,356	19	5,261
1851	5th Duke of Richmond	91	162	674	4,175	19	5,121
1852	2nd Earl of Duple	93	156	711	4,002	19	4,981
1853	2nd Lord Aunburton	90	147	739	3,928	19	4,922
1854	Mr. Philip Pusey	88	146	771	4,152	20	5,177
1855	Mr. William Miles, M.P.	89	141	795	3,838	19	4,882
1856	1st Viscount Portman	85	139	839	3,896	20	4,979
1857	Viscount Osmington	83	137	896	3,933	19	5,068
1858	6th Lord Bernal	81	133	904	4,010	18	5,146
1859	7th Duke of Marlborough	78	130	927	4,008	18	5,161
1860	5th Lord Walsingham	72	119	927	4,047	18	5,188
1861	3rd Earl of Powis	84	90	1,113	3,328	18	4,633
1862	H.R.H. The Prince Consort 1st Viscount Portman	83	97	1,151	3,475	17	4,823
1863	Viscount Eversley	80	88	1,268	3,735	17	5,183
1864	2nd Lord Feversham	78	45	1,343	4,013	17	5,496
1865	Sir E. C. Kerrison, Bart., M.P.	79	81	1,386	4,190	16	5,752
1866	1st Lord Tredegar	79	84	1,395	4,049	15	5,622
1867	Mr. H. S. Thompson	77	82	1,388	3,903	15	5,465
1868	6th Duke of Richmond	75	74	1,409	3,888	15	5,461
1869	H.R.H. The Prince of Wales, K.G.	75	73	1,417	3,864	17	5,446
1870	7th Duke of Devonshire	74	74	1,511	3,794	15	5,436
1871	6th Lord Vernon	72	74	1,589	3,896	17	5,643
1872	Sir W. W. Wynn, Bart., M.P.	71	73	1,655	3,953	14	5,768
1873	3rd Earl Cathcart	74	62	1,832	3,936	12	5,916
1874	Mr. Edward Holland	76	58	1,944	3,756	12	5,546
1875	1st Viscount Aldborough	79	79	2,058	3,918	11	5,145
1876	2nd Lord Cathcart	88	78	2,164	4,013	11	5,649
1877	Lord Melmerdale	81	76	2,239	4,073	17	5,456
1878	Col. Kingscote, C.B., M.P.	81	72	2,323	4,130	26	6,657
1879	H.R.H. The Prince of Wales, K.G.	81	72	2,453	4,700	26	7,582
1880	9th Duke of Bedford	83	70	2,673	5,038	20	7,629
1881	Mr. William Wells	85	69	2,765	5,041	19	7,979
1882	Mr. John Dent	82	71	2,849	5,058	19	8,050
1883	6th Duke of Richmond and Gordon	78	71	2,979	4,952	19	8,096
1884	Sir Brandreth Gibbs	72	72	3,203	5,495	21	8,776
1885	Sir Massey Lopes, Bart., M.P.	71	69	3,355	5,619	20	9,135
1886	H.R.H. The Prince of Wales, K.G.	70	61	3,414	5,569	20	9,134
1887	Lord Egerton of Tatton	71	64	3,440	5,387	20	8,982
1888	Sir M. W. Ridley, Bart., M.P.	66	56	3,521	5,325	16	8,884
1889	H.R. MAJESTY QUEEN VICTORIA	78	58	3,567	7,133	15	10,866
1890	Lord Moreton	122	58	3,846	6,941	17	10,984
1891	2nd Earl of Ravensworth	117	60	3,811	6,921	19	10,928
1892	1st Earl of Feversham	111	69	3,784	7,066	20	11,050
1893	1st Duke of Westminster, K.G.	107	74	3,786	7,138	21	11,126
1894	8th Duke of Devonshire, K.G.	113	73	3,798	7,212	22	11,218
1895	Sir J. H. Thordail, Bart.	120	80	3,747	7,179	23	11,149
1896	Sir Walter Gilbey, Bart.	126	83	3,695	7,253	23	11,180
1897	H.R.H. The Duke of York, K.G.	126	83	3,705	7,235	24	11,223
1898	5th Earl Spencer, K.G.	121	79	3,687	7,182	25	11,094
1899	Earl of Coventry	116	75	3,655	7,009	23	10,879
1900	H.R.H. The Prince of Wales, K.G.	111	71	3,628	6,832	24	10,666
1901	3rd Earl Cawdor	102	70	3,594	6,338	27	10,033
1902	H.R.H. Prince Christian, K.G.	100	69	3,500	5,955	26	9,650
1903	H.R.H. The Prince of Wales, K.G.	99	82	3,489	5,771	27	9,598
1904	16th Earl of Derby, K.G.	96	88	3,375	5,906	32	9,477
1905	9th Lord Middleton	89	78	3,212	5,758	33	9,170
1906	Mr. F. S. W. Cornwallis	94	155	3,132	6,180	30	9,660
1907	4th Earl of Yarborough	91	174	3,076	6,290	29	9,569
1908	9th Duke of Devonshire	89	178	3,019	6,442	30	9,758
1909	7th Earl of Jersey, G.C.B.	91	177	2,951	6,696	31	9,946
1910	Sir Gilbert Gressall, Bart.	86	166	2,878	6,934	31	10,095
1911	H.R. MAJESTY KING GEORGE V.	85	168	2,805	7,191	30	10,279
1912	9th Lord Middleton	85	170	2,741	7,283	30	10,309

TABLE SHOWING THE NUMBER OF GOVERNORS AND MEMBERS IN EACH YEAR FROM THE ESTABLISHMENT OF THE SOCIETY—*contd.*

Year	President of the Year	Governors		Members			Total
		Life	Annual	Life	Annual	Honorary	
1913	2nd Earl of Northbrook	89	168	2,691	7,474	26	10,448
1914	4th Earl of Powis	89	173	2,626	7,629	28	10,545
1915	Duke of Portland, K.G. . . [K.G.]	88	184	2,517	7,313	28	10,180
1916	7th Duke of Richmond and Gordon,	83	185	2,427	7,526	27	10,248
1917	Mr. Charles Adesane, C.B. . . .	93	210	2,412	8,214	26	10,955
1918	Hon. Cecil T. Parker	102	224	2,395	8,226	25	10,972
1919	Sir J. B. Bowen-Jones, Bart. . .	119	236	2,411	8,558	24	11,348
1920	H.R.H. The Prince of Wales, K.G..	129	256	2,402	9,208	25	12,020
1921	Mr. R. M. Greaves	137	275	2,374	10,096	24	12,908
1922	H.R.H. The Duke of York, K.G. .	144	287	2,317	10,596	22	13,866
1923	Lt. Col. E. W. Stanforth	153	293	2,262	10,778	20	13,506
1924	Mr. Ernest Mathews, C.V.O. . .	159	289	2,201	10,676	21	13,348
1925	Sir Gilbert Greenall, Bart. C.V.O..	158	291	2,160	10,949	15	13,573
1926	Lord Desborough, G.C.V.O. . . .	155	276	2,103	10,251	15	12,800
1927	Viscount Tredegar, C.B.E. . . .	153	287	2,035	9,343	15	11,803
1928	Lord Harlech, C.B. . . .	155	277	1,972	9,042	16	11,462
1929	Earl of Harewood, K.G. . . .	154	273	1,814	8,813	16	11,170
1930	H.R.H. The Duke of Gloucester,	158	264	1,882	8,491	16	10,311
	K.G.						
1931	Sir Arthur Hazlerigg, Bart. . .	153	245	1,823	8,036	16	10,273

STATEMENT made to the Council by the Chairman of the Finance Committee, on presenting the Accounts for the year 1931.

Mr. ADEANE presented the accounts and balance-sheet for 1931, and moved their adoption. He stated that the Society began the year 1931 with a balance of £2,759; the ordinary receipts during the year amounted to £17,649, and other receipts to £742, making a total of £21,150. On the payments side the ordinary expenditure was £15,997; there was extraordinary expenditure of £623, and in addition the sum of £2,097 was put on deposit. The credit balance of cash at bankers and in hand carried forward amounted to £2,433. The remaining expenditure, amounting to £747, in connection with the renewal of the lease on the Society's House, had been paid during the last year out of income. Turning to the balance-sheet, the invested reserve fund was £144,544, compared with £159,515 at the end of 1930. The decrease of £14,971 was entirely due to the decline in the market values of the investments at December 31st, 1931, compared with the values at the end of the previous year. Since then the depreciation had been almost made good by the recovery in the gilt-edged market. (Hear, hear.) In connection with the estimate of receipts and expenditure on ordinary account for the present year, the income was estimated to be £16,716 and the expenditure £16,464. Provision was made for the expenditure of £1,128 in connection with the Society's text book *Elements of Agriculture*. The surplus of receipts over expenditure for the year was estimated at £252.

The Accounts and Balance-sheet were then adopted, together with the Estimate for the ensuing year, which was as follows :—

ESTIMATE OF ORDINARY RECEIPTS AND EXPENDITURE FOR 1932

(Other than in respect of the Show.)

Prepared by direction of the Finance Committee.

Actual figures for 1931. £		Estimate for 1932. £
<i>Receipts.</i>		
9,900	Subscriptions of Governors and Members	9,000
291	Interest on Daily Balances and Deposit Account	300
6,831	Interest on Investments	6,824
201	Sales of Journals, Text Books, Pamphlets, etc.	200
152	Advertisements in Journal	150
78	Income Tax to be refunded	62
158	N.D.D. Entry Fees, etc.	150
29	Hire of Council and Committee Rooms	30
<u>17,649</u>		<u>16,716</u>
<i>Expenditure.</i>		
£		£
4,288	Salaries :—Secretary and Official Staff	4,288
310	Pensions to Officials	310
1,000	House, Rent, Lighting, Cleaning, Wages, etc. (say)	1,000
408	Printing and Stationery	400
178	Postage	160
206	Miscellaneous	200
1,390	Journal	1,550
415	Chemical Department	415
250	Botanical Department	250
200	Zoological Department	200
403	Veterinary Department	403
100	Grant to Research Institute, Reading University	50
364	Examinations for National Diplomas	360
3,500	Amount set aside towards Loss on Shows	3,500
<u>13,018</u>		<u>13,086</u>
<i>Exceptional Expenditure.</i>		
£		£
1,639	Scientific Research	1,700
615	Additions, Alterations, Painting, Cleaning and Repairs to Society's House and Council Chamber	—
132	Repairs and Additions to Society's Furniture	100
24	Library : Binding and Purchase of Books	25
256	Legal Charges and Auditors' Fees (say)	300
—	Certificates and Medals for Long Service and Skilled Labour	10
15	Donation to Young Farmers' Clubs	15
—	Elements of Agriculture	1,128
98	Dinner to Secretaries of Breed Societies	100
50	Grant to "Butter Marking Order" Enquiry	—
100	Grant to Leathersellers' Company re Warble Fly Investigation	—
<u>15,997</u>		<u>16,464</u>
	Estimated Receipts	£16,716
	Estimated Expenditure	16,464
	Estimated Surplus of Receipts over Expenditure	<u>£252</u>

STATEMENT OF RECEIPTS AND EXPENDI-

JULY 7 to

Corresponding figures for 1890.	£	Receipts.					
		£	s.	d.	£	s.	d.
2,000		Subscription from the Town and County of Warwick			2,000	0	0
2,222		Prizes given by Agricultural and Breed Societies and others	2,157	16	8		
1,303		Prizes given by Warwick Local Committee	1,378	0	0		
					3,530	16	8
3,725		<i>Contribution from Local Committee towards cost of fencing to</i>					
678		<i>Showground</i>					
400		<i>Contribution from Local Committee to Show Fund</i>					
					—	—	—
		FEES FOR IMPLEMENTS, MACHINES AND MISCELLANEOUS EXHIBITS:					
12,886		Exhibitors' payments for Shedding and Space	9,923	15	0		
285		Non-Members' Fees for entry of Implements, etc.	235	0	0		
110		Fees for entry of "New Implements"	145	0	0		
					10,303	15	0
13,281		FEES FOR ENTRY OF LIVE STOCK:—					
4,752		487 Members' Entries @ 3l.	1,401	0	0		
—		1,165 do. do. @ 22 10s.	2,912	10	0		
2,051		1,232 Members' Entries @ 30s.	1,848	0	0		
278		307 Members' Entries @ 1l.	307	0	0		
32		68 Members' Entries @ 15s.	51	0	0		
17		41 Members' Entries @ 10s.	20	10	0		
9		50 Members' Entries @ 5s.	12	10	0		
75		Entrance fees	66	0	0		
324		29 Non-Members' Entries @ 6l.	174	0	0		
—		33 do. do. @ 5l.	165	0	0		
84		25 Non-Members' Entries @ 3l.	75	0	0		
18		13 Non-Members' Entries @ 2l.	26	0	0		
8		5 Non-Members' Entries @ 30s.	—				
17		20 Non-Members' Entries @ 1l.	20	0	0		
1		2 Non-Members' Entries @ 10s.	1	0	0		
—		1 Non-Member's Entry @ 5s.	—				
7,666			7,079	10	0		
—		Less:—Fees returned in connection with outbreaks of Foot and Mouth disease and Swine Fever	98	10	0		
7,666					6,981	0	0
		FEES FOR ENTRY OF POULTRY:—					
127		Members:—426 Entries @ 5s.	106	10	0		
196		Non-Members:—315 Entries @ 10s.	157	10	0		
4		Entrance fees	10	1	0		
					274	1	0
327		OTHER ENTRY FEES:—					
197		Produce	97	15	0		
177		Horse-jumping Competitions	192	0	0		
20		Plantations Competition	13	11	6		
14		Orchards and Fruit Plantations Competition	9	0	0		
31		Butter-Making Competition	42	17	6		
					355	4	0
439		CATALOGUE:—					
11		Extra lines for particulars of Implement exhibits	14	17	0		
5		Woodcuts of "New Implements"	5	1	3		
998		Advertising in Catalogue	674	16	9		
34		Sales of Implement Section of Catalogue	26	8	3		
1,003		Sales of Combined Catalogue	768	16	6		
72		Sales of Jumping Programmes and Awards	49	12	6		
2,123			1,539	12	3		
70		Less:—Expenses of Sales Superintendent and Assistants	74	14	0		
					1,464	18	3
2,053							
£39,569		Carried forward			£24,908	14	11

TURE OF THE SHOW AT WARWICK, JULY 11, 1931.

Corresponding figures for 1930.

£

Expenditure.

		COST OF ERECTION AND MAINTENANCE OF SHOWYARD:—£ s. d. £ s. d.			
3,512	{	Transferring Society's permanent buildings from Manchester to Warwick (including taking down and re-erecting and part cost of new second entrance)	3,522	16	11
917		Fencing round Showyard	536	0	6
2,577		Implement Shedding	2,163	8	6
6,668		Stock Shedding	6,087	12	4
—		Stock Shedding for Isolation Camp	187	14	3
501		Poultry and Produce Sheds	414	19	9
645		Dairy	611	11	6
116		Fodder Shed and Office	116	15	6
243		Forestry Tent	111	10	0
1,292		Grand Stand and Large Ring	902	19	7
938		Various Offices and Stands	903	15	5
418		Painting Signs and Fixing Ditto, Fencing and Judging Rings	318	13	5
95		Insurance	116	16	0
2,690		Hire of Canvas	2,108	19	10
1,168	{	General Labour (including Society's Clerk of Works) and Horse Hire	1,369	4	9
68		Bee Shed	69	17	6
102		Horse-Shoeing Shed	97	17	8
21,950			19,620	13	5
37			37	0	0
21,913		Less 74 Flagpoles @ 10s.			19,583 13 5
		SURVEYOR:—			
558	{	Salary, £500; Travelling and Hotel Expenses, £161 17s. 10d.; Clerk, £10 10s.; Stationery and Sundry Expenses, £38 4s. 9d.		710	12 7
		PRINTING:—			
658	{	Printing of Prize Sheet, Entry Forms, Admission Orders, Circulars to Exhibitors, Prize Cards, Tickets and Miscellaneous (including stationery)	635	12	10
42		Programmes for Members	41	9	6
910		Catalogue: Printing and paper	311	16	1
231		Catalogue: Binding	202	15	11
17		Catalogue: Carriage	7	18	0
65		Award Lists	35	0	0
21		Programmes of Jumping Competitions	15	0	0
1,944				1,749	12 4
		ADVERTISING:—			
269		Advertising Closing of Entries in Newspapers	216	13	0
782		Advertising Show in Newspapers	495	11	3
964		Billposting and Advertising Boards	877	10	3
217		Printing and writing Posters, Window Cards, Stamps, etc.	255	6	11
2,232				1,845	1 5
		POSTAGE, CARRIAGE, &c.:—			
234		General Postage	220	4	3
61		Postage of Badges to Members	58	4	0
23		Carriage of Luggage, etc.	14	2	7
318				292	10 10
		AMOUNT OF PRIZES AWARDED, (including: £3,580 16s. 8d., given by various Societies and Warwick Local Committee)			
12,209	{			11,740	11 3
		COST OF FORAGE FOR LIVE STOCK:—			
1,529	{	Hay, £238 14s. 10d.; Straw, £698 0s. 3d.; Green Food, £217 13s. 3d.		1,154	8 4
		JUDGES' FEES AND EXPENSES:—			
607	{	Judges of Miscellaneous Implements, £24 15s.; Horses, £61 17s. 4d.; Cattle, £177 19s. 4d.; Sheep, £151 6s. 11d.; Pigs, £49 7s. 3d.; Produce, £41 5s. 4d.; Goats, £6 5s. 10d.; Luncheons, £74 10s.		587	7 2
45		Badges for Judges and other officials		53	9 2
73		Rosettes		63	13 1
£41,429		Carried forward		£27,789	8 0

STATEMENT OF RECEIPTS AND EXPENDITURE

Corresponding figures for 1930.		Receipts (contd.).	£	s.	d.	£	s.	d.
£								
30,569	Brought forward					£24,909	14	11
	MISCELLANEOUS RECEIPTS :—							
1,086	Admissions to Flower Show		1,139	7	2			
1,853	Garage		1,872	2	3			
185	Rent for Railway Offices		185	0	0			
75	Premium for Cloak Rooms		75	0	0			
170	Rent for Ministry of Agriculture Pavilion		170	0	0			
250	Advertisements in Stock Prize Sheet		200	6	10			
—	Bathchairs		4	17	0			
19	Miscellaneous		26	17	9			
200	Contribution from Local Committee to cost of "Musical Ride"		200	0	0			
3,838						3,873	11	6
	ADMISSIONS TO SHOWYARD :—							
1,219	Tuesday, July 7, @ 10s.		911	0	0			
3,555	Wednesday, July 8, @ 5s.		2,719	16	0			
4,583	Thursday, July 9, @ 3s.		3,468	6	9			
2,214	Friday, July 10, @ 2s. 6d.		1,801	14	4			
1,812	Saturday, July 11, @ 1s.		944	10	8			
387	Season Tickets		117	12	0			
502	Day Tickets		475	14	6			
14,272						10,458	14	3
	ENTRANCES TO HORSE RING :—							
321	Wednesday, July 8		252	11	6			
381	Thursday, July 9		233	12	6			
255	Friday, July 10		197	6	0			
317	Saturday, July 11		172	14	0			
672	Tickets sold for Reserved Enclosure		804	0	6			
1,946						1,680	4	6
	SALES :—							
163	Sales of Produce at Dairy					115	15	2
19	Outstanding Receipts in respect of Manchester Show					39	15	5
50,807						£41,057	15	9
—	Debit Balance					£3,296	14	3
£50,807						£44,354	10	0

Examined, audited, and found correct, this 26th day of November, 1931.

T. B. TURNER, Secretary.
PRICE, WATERHOUSE & Co.,
Chartered Accountants.

OF THE SHOW AT WARWICK (*continued*).

Corresponding figures for 1890.		Expenditure (<i>contd.</i>).	£ s. d.	£ s. d.
£				
41,429		Brought forward		£37,780 0 0
—		GENERAL ADMINISTRATION :—		
81		<i>Honorary Director :—</i> Travelling, Entertaining, etc.	245	10 10
181		<i>Stewards of Stock, Implements and Hospitality :—</i> Personal and Railway Expenses, etc.	88	12 11
464		<i>Assistant Stewards of Stock :—</i> Personal and Railway Expenses	192	1 3
		<i>Official Staff :—</i> Extra Clerks, £129 18s. 6d.; Lodgings, 248 7s. 8d.; Maintenance of Staff, £65 18s. 5d.; Travelling Expenses, £8 2s. 6d.; Secretary's Hotel and Travelling Expenses, £115 9s.	367	16 1
233		<i>Finance Office :—</i> Stewards, £20 18s. 2d.; Finance Clerk, £10 10s.; Grand Stand Men, £51 1s. 0d.; Turnstile Men, £50 10s. 10d.; Bank Staff, £57 5s.; Refreshments, £11 8s. 6d.	210	14 3
85		<i>Awards Office :—</i> Clerks, £60 15s. 9d.; Boys, £21.	81	15 9
1,044				1,195 11 1
—		General Management :—		
157		Foremen and Assistant Foremen	152	10 9
78		Yardmen	80	0 0
177		Door and Gate Keepers	146	8 6
110		Garage :—Tents, Offices, etc.	40	5 0
114		<i>Veterinary Department :—</i> Veterinary Inspectors	113	15 9
110		<i>Engineering Department :—</i> Consulting Engineer	00	14 0
1,071		<i>Police :—</i> Metropolitan Police, £907 4s. 2d.; Commissionaires, £12 2s. 10d.	1,000	7 0
1,817				1,608 10 0
837		<i>Dairy :—</i> Steward and Assistant Stewards, £82 0s. 4d.; Staff, £222 12s. 2d.; Milk, £171 7s.; Ice, £23 15s.; Utensils, £117 18s. 4d.; Engineers, £118 14s. 2d.; Butter Tests, £24 10s. 6d.; Labour, £12 10s. 6d.; Butter and Cheese Boxes, £3 11s.; Refreshments, £22 14s. 7d.; Fuel, £2 14s.; Miscellaneous, £4 14s. 4d.	807	16 11
11		<i>Analysis of Cider</i>	9	0 0
127		<i>Poultry :—</i> Fanning and Feeding, £44 2s. 6d.; Cartage, £13 4s. 6d.; Judges, £33 8s. 11d.; Superintendent, £15	105	15 11
975				922 12 10
679		<i>Flower Show :—</i> Steward and Assistant, £34 18s. 4d.; Manager, £57; Hire of Tents, etc., £440 6s. 3d.; Judges, £21 2s. 2d.; Medals, £15 16s. 11d.; Labour, £57 13s. 8d.; Carriage and Cartage, £38 4s. 0d.; Miscellaneous, £36 8s. 1d.	701	10 2
78		Plantations Competition	63	12 10
92		Orchards and Fruit Plantations Competition	64	4 0
543		"Musical Ride"	569	12 3
—		GENERAL SHOWYARD EXPENSES :—		
170		Band	185	0 0
135		Hire of Furniture	335	8 3
50		Telephone and Call Boxes	19	12 5
6		Telegraph Facilities	6	8 0
66		Official Luncheons	58	11 0
65		St. John Ambulance	02	2 0
15		Billposting in Showyard	12	5 0
14		Medals	12	6 3
46		Engraving and forwarding Cups	42	15 0
25		Plans, Blocks and Maps	19	6 8
173		Forestry	164	0 9
5		Tan	0	0 0
216		Sleepers	228	19 4
28		Hire of Tents and Marquee	28	15 0
18		Weightbridge : Carriage and Erection Charges	11	6 3
73		Testing New Implements for Silver Medal and cost of Medals	78	5 8
149		Miscellaneous	112	16 0
27		Gas, Coal and Firewood	35	18 11
—		Bathchairs	13	12 4
1,281				1,483 17 8
11		Outstanding accounts in respect of Manchester Show	19	19 2
47,949				£44,354 16 0
2,858		<i>Credit Balance</i>		
£50,807				£44,354 16 0
—		Contribution from Ordinary Account to Show Fund	£2,500	0 0
—		Less debit balance (as above)	2,380	14 2
—				£119 8 8

STATEMENT OF RECEIPTS AND

Figures for
1930.
£

Receipts.

	£	s.	d.	£	s.	d.	£	s.	d.
CASH AT BANKERS AND IN HAND, JANUARY 1, 1931:—									
198	Reserve Fund Account	.	.	.	.	.	2	15	0
2,057	Current Account	.	.	.	.	.	2,597	9	2
655	University Grant Account	.	.	.	.	.	—	—	—
179	Cash in Hand	.	.	.	.	.	158	18	10
3,089							2,758	18	0

ANNUAL SUBSCRIPTIONS:—

1,485	Governors' for 1931	.	.	.	.	.	1,386	4	0
8,892	Members' for 1931	.	.	.	.	.	8,445	19	6
51	Subscriptions for previous years	.	.	.	.	.	48	12	0

LIFE GOVERNORS AND MEMBERS:—

29	Annual Contributions	.	.	.	.	.	28	7	0
10,457							9,909	2	6

MISCELLANEOUS:—

6,490	Interest on Investments	.	.	.	.	.	6,830	18	4
273	Interest on Daily Balances and Deposit Account	.	.	.	.	.	290	14	10
52	Income Tax refunded	.	.	.	.	.	77	18	4
41	Sales of Pamphlets, Farm Account Books, etc.	.	.	.	.	.	39	9	0
—	Sales of Library Catalogue	.	.	.	.	.	1	11	8
76	Sales of Text Books	.	.	.	.	.	63	9	5
78	Sales of Journals	.	.	.	.	.	96	4	10
239	Advertisements in Journal	.	.	.	.	.	152	4	5
158	N.D.D.: Entry Fees and Sales of Exam. Papers	.	.	.	.	.	158	6	3
43	Hire of Council and Committee rooms	.	.	.	.	.	29	8	0
	Royal Lancashire Agricultural Society: re their New								
93	Members' privileges for 1930 Show	.	.	.	.	.	—	—	—
23	Miscellaneous	.	.	.	.	.	—	—	—
7,566							7,740	5	1
18,023	Total of Ordinary Receipts	.	.	.	.	.	17,849	7	7
610	Life Compositions of Governors and Members	.	.	.	.	.	296	0	0
105	Donations to Society's Funds	.	.	.	.	.	151	4	6
135	Subscriptions for 1932	.	.	.	.	.	147	15	0
67	Argentine Rural Society—balance owing 1929	.	.	.	.	.	—	—	—
	Refunded in respect of payments to Willesden Urban								
310	District Council	.	.	.	.	.	189	7	3
20	Show Account: for amount owing on Dec. 31, 1930	.	.	.	.	.	7	7	10
1,257							741	14	7

PAYMENTS FOR THE YEAR 1931.

xv

Figures for 1930.		Payments.	£ s. d.	£ s. d.	£ s. d.
£					
4,239	GENERAL ADMINISTRATION :—				
299	Salaries : Secretary and Official Staff (including clerical assistance)	4,288	8	10	
268	Pensions to Officials	310	7	0	
992	Legal Charges and Auditors' Fees, etc.	255	19	6	
408	Rent, Rates, Taxes, Insurance and House Expenses	1,005	13	2	
160	Printing and Stationery	408	8	5	
226	Postage	177	15	11	
6,592	Telephones, Telegrams and Miscellaneous Expenses	195	16	3	
				6,042	9 1
1,030	JOURNAL OF THE SOCIETY :—				
287	Cost of Volume 91 :—				
393	Printing and Binding	950	18	10	
18	Postage	273	14	11	
1,728	Literary Contributions	148	11	0	
106	Illustrations	11	13	8	
1,834		1,884	18	5	
10	On account of Volume 92	4	14	6	
414				1,389	12 11
250	Advertising Farm Account Books			9	12 6
200	LABORATORY :—				
100	Salary and Petty Cash			414	12 4
403	OTHER SCIENTIFIC DEPARTMENTS :—				
100	Botanist's Salary	250	0	0	
3	Zoologist's Salary	200	0	0	
1,056	Consulting Engineer				
289	Grant to Royal Veterinary College	400	0	0	
69	Grant to Research Institute, Reading	100	0	0	
115	Medal for Proficiency in Cattle Pathology	2	14	6	
106				952	14 6
7	NATIONAL DIPLOMA IN AGRICULTURE :—				
73	Honoraria and Expenses of Examiners	308	15	9	
661	Travelling Expenses of Officials, etc.	85	7	3	
458	Hotel Expenses of Examiners, Officials, etc.	108	14	10	
203	Printing, Stationery, Diplomas and Postage	70	13	1	
102	Hire of Premises	7	7	0	
101	Salary for Assistant	75	0	0	
136		628	17	11	
73	Less Entry Fees and Sales of Examination Papers	501	18	0	
64		126	19	11	
20	Less amount paid by Highland and Agricultural Society	63	12	3	
293				63	7 8
	NATIONAL DIPLOMA IN DAIRYING :—				
1,673	Honoraria and Expenses of Examiners	182	17	6	
500	Hotel and Travelling Expenses	74	13	10	
18	Printing, Diplomas, Postage, and allowance for assistant	61	16	0	
1,103	Hire of Premises and balance of Expenses re 1930 Exam.	31	1	1	
	(For Entry Fees, Sales of Exam. Papers etc., see contra.)				
	EXTRA EXPENDITURE :—			300	8 5
1,673	Grant to Research Fund	1,689	5	5	
500	Grant re World's Agricultural Tractor Trials				
18	Library : Binding and Purchase of Books	28	15	6	
1,103	Additions, Alterations, Painting and Repairs to house	567	6	10	
	Cleaning and Painting Council Chamber	47	10	0	
	Repairs to Furniture	132	13	6	
16	Certificates and Medals for Long Service				
3	Printing "Occasional Notes"				
16	Dinner to Secretaries of Breed Societies	98	5	0	
25	Donation to Young Farmers' Clubs	15	0	0	
	Grant to Leathersellers' Co., re Warble Fly Investigation	100	0	0	
	Grant to Butter Marking Order Committee	50	0	0	
3,354				2,723	16 3
3,500	Amount set aside towards Loss on Shows			3,500	0 0
17,154	Total of Ordinary Payments				15,996 13 8
	Argentine Rural Society (recoverable)			52	14 8
454	Payments to Willesden Urban District Council			260	3 2
543	Transfer to Deposit Account			2,096	14 3
300	Purchase of 3½ per cent. Conversion Stock				
88	Additions to Show Plant			190	0 0
	Additions to Furniture and Equipment			83	7 0
7	Show Account : for Postage and Printing			19	4 4
83	Rent, 12, Hanover Square (less amount received)				
982	Grant to Cambridge University re Rockefeller Foundation			18	7 4
2,456					2,720 10 9
3	CASH AT BANKERS AND IN HAND, DECEMBER 31, 1931 :—				
2,597	Reserve Fund Account			299	15 0
159	Current Account			1,978	12 1
2,759	Petty Cash in Hand and at Bank			154	8 8
£22,369					2,432 15 9
					£21,159 0 8

Examined, audited and found correct,

3 FREDERICK'S PLACE,
OLD JEWRY, LONDON, E.C.2.
17th February, 1932.

PRICE, WATERHOUSE & CO.,
Chartered Accountants,
Accountants & Auditors.

ROYAL AGRICULTURAL

<i>Dr.</i>		BALANCE SHEET,		
Figures for 1930.		£ s. d.	£ s. d.	£ s. d.
	To SUNDRY CREDITORS—			
2,400	Sundry accounts owing	2,253	6	6
135	Subscriptions received in 1931 but belonging to 1932	147	15	0
				2,401 1 6
2,535				
	To CAPITAL and RESERVE FUND:—			
132,131	As at December 31, 1930	171,234	8	6
	SHOW FUND—			
3,500	Contribution from Ordinary account	3,500	0	0
2,858	Less Deficit on Warwick Show	3,298	14	8
(Surplus)				203 5 9
6,358				
610	Life Compositions received in 1931	298	0	0
104	Donations towards the Society's Funds	151	4	6
157	Subscriptions for 1931 received in 1930	135	3	0
	Excess of ordinary receipts over payments for the year 1931	1,052	13	11
869				
160,229		173,672	15	8
(Add)	<i>Less : Depreciation in market values of Investments</i>	14,971	0	6
12,722				
172,951		158,701	6	2
	<i>Less : Balance of Grant to Cambridge University re Rockefeller Foundation</i>	18	7	4
982				
171,969		158,682	18	10
	<i>Less Adjustment in respect of outstanding Assets and Liabilities</i>	98	18	6
259				
171,710		158,584	0	4
	DEPRECIATION written off, viz:—			
12	Fixtures	10	13	6
26	Furniture	23	17	6
338	Show Plant	312	14	7
100	Lease of 16 Bedford Square	100	0	0
				447 5 7
476				158,136 14 9
171,234				

NOTE—There are commitments in respect of Contracts entered into in connection with the forthcoming Show.

£173,769

£158,587 16 3

T. B. TURNER,
Secretary.
18th February, 1932.

SOCIETY OF ENGLAND.

xvii

DECEMBER 31, 1931.

Cr.

Figures for 1930.			£	s.	d.	£	s.	d.
	By RESERVE FUND—							
126,393	154,600l. 4s. 11d. Conversion Loan 3½ per cent. (1931) @ 73½*		114,024	6	5			
708	500l. War Savings Certificates*		733	0	8			
2,639	3,900l. 16s. Local Loans 3 per cent. (1912) @ 81*		2,884	10	7			
2,585	2,840l. 13s. 6d. Metropolitan 3 per cent. Consolidated Stock (1941) @ 83*		2,357	15	3			
6,136	6,528l. 1s. 6d. Canadian 4 per cent. Stock (1940-1960) @ 82½*		5,385	13	3			
15,754	15,294l. 13s. 2d. War Loan 5 per cent. (1929-1947) @ 96*		14,682	17	5			
5,300	5,000l. Conversion Loan 5 per cent. (1944-1964) @ 99½*		4,975	0	0			
159,515						144,543	18	7
	* Market value at December 31, 1931.							
	By LEASE OF 16 BEDFORD SQUARE		600	0	0			
600	Less Amount written off in 1931		100	0	0			
						500	0	0
	By FIXTURES, FITTINGS, etc.—							
	As at December 31, 1930		142	6	6			
142	Less Depreciation at 7½ per cent.		10	13	6			
						131	13	0
	By FURNITURE—							
	As at December 31, 1930		238	14	4			
	Less Depreciation at 10 per cent.		23	17	6			
			214	16	10			
239	Added during year		83	7	0			
						298	3	10
1,500	By PICTURES (500l.) and BOOKS (1,000l.)					1,500	0	0
	By SHOW PLANT—							
	As at December 31, 1930		3,127	5	10			
	Less Depreciation at 10 per cent.		312	14	7			
			2,814	11	3			
3,127	Added during year		190	0	0			
						3,004	11	3
1,680	By EXPENDITURE (less amounts received) ON SOUTHAMPTON SHOW.					1,602	6	0
510	By SUNDRY DEBTORS					474	8	7
93	By RATES PAID IN ADVANCE AND INCOME TAX RECOVERABLE					71	18	11
	By CASH AT BANKERS AND IN HAND—							
	ORDINARY ACCOUNT—							
3	Reserve Fund Account		299	15	0			
2,597	Current Account		1,978	12	1			
3,700	Deposit Account		6,000	0	0			
159	Petty Cash in Hand and at Bank		154	8	8			
6,459			8,432	15	9			
95	Less SHOW ACCOUNT—Overdrawn		21	10	8			
6,364						8,410	16	1
£173,769						£168,537	16	8

3 FREDERICK'S PLACE,
OLD JEWRY, LONDON, E.C.2.
17th February, 1932.

Examined, audited and found correct.
PRICE, WATERHOUSE & Co.,
Chartered Accountants,
Accountants & Auditors.

Royal Agricultural Society of England.

STATEMENTS OF FUNDS HELD BY THE SOCIETY IN TRUST OR WHICH ARE NOT CONSIDERED AVAILABLE FOR GENERAL PURPOSES, DECEMBER 31, 1931.

E. H. HILLS' BEQUEST.

	£	s.	d.	£	s.	d.
To amount bequeathed for Pot-culture Experiments	9,000	0	0	By 7,222 <i>l.</i> 15 <i>s.</i> 0 <i>d.</i> 3¼% Conversion Loan Stock (1901)		
Less: Depreciation of Consols at	£	s.	d.	(purchased on sale of War Loan Stock) at cost	5,016	1 10
time of conversion	3,582	7 11		(<i>Value December 31, 1931, at 73½ = 5,320<i>l.</i> 15<i>s.</i> 7<i>d.</i></i>)		
.. Cost of conversion	134	14 7				
			3,717 2 6			
			<hr/>			
To surplus on sale of 5% War Loan Stock	5,282	17 0				
	333	4 4				
			<hr/>			
	55,616	1 10				
			<hr/>			
	£5,616	1 10				

QUEEN VICTORIA GIFTS FUND.

	£	s.	d.	£	s.	d.
To Fund invested (the income from this Fund is used to make Annual Grants to unsuccessful applicants for pension through the Royal Agricultural Benevolent Institution)	5,000	0 0		By Investments in names of Trustees: at cost:		
Undistributed Income	79	8 3		1,000 <i>l.</i> Dominion of Canada 3% Inscribed Stock	1,082	14 0
				1,000 <i>l.</i> Victorian Government 5% Inscribed Stock		
				1932-1942	1,070	4 4
				1,000 <i>l.</i> New South Wales Government 5% Inscribed Stock, 1936-55	1,095	5 6
				1,000 <i>l.</i> London Midland & Scottish Railway Consol. dated 4% Guaranteed Stock	1,556	15 9
				190 <i>l.</i> 4 <i>s.</i> 6 <i>d.</i> 2¼% Consols	215	0 5
					<hr/>	
				By Cash at Bank, December 31, 1931	5,000	0 0
					79	8 3
					<hr/>	
					£5,079 8 3	

The market values of the Stocks on December 31, 1931, amounted to 3,040*l.* 11*s.* 6*d.*

STATEMENT OF FUNDS HELD BY THE SOCIETY IN TRUST—continued.

GILBEY FUND.

To Amount provided by the late Sir Walter Gilbey for endowment of Lectureship at Cambridge University	£	s.	d.	By Investment at cost :—	£	s.	d.
Accumulation of Interest	1,000	0	0	1,457 <i>l.</i> 5 <i>s.</i> 2 <i>d.</i> Metropolitan Water "A" Stock	1,204	10	4
	204	10	4	(Value on December 31, 1931, at 58½ = 852 <i>l.</i> 9 <i>s.</i> 11 <i>d.</i>)			

£1,204	10	4	£1,204	10	4
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SUPERANNUATION AND INSURANCE FUND.

To amount set aside in accordance with declaration of Trust of July 26, 1911				By Investments in names of Trustees, at cost :—			
£	s.	d.		£	s.	d.	
9,171	5	0		8,817 <i>l.</i> 7 <i>s.</i> 1 <i>d.</i> 5% War Loan Stock (1929-1947)	8,244	3	8
Less : Depreciation of Consols at time of conversion				738 <i>l.</i> 2 <i>s.</i> 4 <i>d.</i> West Australian 3½% Stock (1935-1955)			
1,837	18	4		640 <i>l.</i> 3 <i>s.</i> 9 <i>d.</i> Queensland 3½% Stock (1950-1970)	559	17	4
256	3	0			467	2	3
2,094	1	4					

Add : Purchase of 1,367 <i>l.</i> 14 <i>s.</i> 9 <i>d.</i> 5% War Loan Stock at cost	1,187	0	0	By Cash at Bank, December 31, 1931	482	1	2
--	-------	---	---	------------------------------------	-----	---	---

Accumulation to December 31, 1931	8,244	3	8	The market values of the Stocks on December 31, 1931, amounted to 9,238 <i>l.</i> 1 <i>s.</i> 4 <i>d.</i>	£9,753	4	5
Income Tax on War Loan Stock Interest	1,398	15	0				
	110	5	0				
£9,753	4	5					

"MERCHANTS OF THE STAPLE OF ENGLAND" FUND.

To capital sum paid by the "Merchants of the Staple of England" for the purpose of providing a fund of the yearly income Prizes to be competed for annually in the Wool Section of the Royal Show	£	s.	d.	By Investment at cost :—	£	s.	d.
	500	0	0	503 <i>l.</i> 1 <i>s.</i> 9 <i>d.</i> New South Wales Government 5% Inscribed Stock, 1935-55	500	0	0
				(Value on Dec. 31, 1931, at 71½ = 359 <i>l.</i> 14 <i>s.</i> 2 <i>d.</i>)			

Examined, audited and found correct.

3 FREDERICK'S PLACE,
OLD JEWRY, LONDON, E.C.2
17th February, 1932.

THOS. WATERHOUSE & Co.,
Chartered Accountants,
Accountants & Auditors.

Royal Agricultural Society of England.

RESEARCH COMMITTEE.

RECEIPTS AND PAYMENTS FOR YEAR 1931.

RECEIPTS.			PAYMENTS.		
	£	s. d.		£	s. d.
To Grant from General Account		1,089 5 5	By Grants to Research Institute in Animal Pathology, Royal Veterinary College, for Research re Mastitis in Cows	300	0 0
" Sales of copies of <i>Agricultural Research</i>	27	15 4	" Grants to Rothamsted Experimental Station for Lucerne Seed Inoculation Experiments	50	0 0
" Advertisements in <i>Agricultural Research</i> in 1929	37	2 3	" Grants to Rothamsted Experimental Station re collating Woburn Farm data	250	0 0
<hr style="border: 1px solid black; width: 100%;"/>			" Grant to Norfolk Agricultural Station for Sugar Beet-Top Feeding Trials	300	0 0
			" Grant to Hampshire County Council Education Committee for Experiments in Hampshire	180	0 0
			" Medals and Grants for Essayists	23	4 0
			" Editing, etc.	20	0 0
			" <i>Agricultural Research</i> in 1930 :—		
			Printing and Binding	205	4 0
			Honoraria to Contributors and Editor	380	0 0
			Postage	29	14 1
			Miscellaneous	9	2 0
			Miscellaneous Expenses	624	0 1
				6	18 11
	<u>£1,754</u>	<u>3 0</u>		<u>£1,754</u>	<u>3 0</u>

3 FREDERICK'S PLACE,
OLD JEWRY, LONDON, E.C.2.
17th February, 1932.

Examined, audited and found correct,
PRICE, WATERHOUSE & Co.,
Chartered Accountants,
Accountants & Auditors.

(Copies of the full Report of any of the Council Meetings held during the year 1931 may be obtained on application to the Secretary, at 16 Bedford Square, London, W.C.1.)

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Minutes of the Council.

WEDNESDAY, FEBRUARY 4, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The PRESIDENT: My Lords and Gentlemen, it is my duty, and a very sad one, before commencing the proceedings of the Council at this my first meeting as President of the Society, to announce to you the death of the Hon. Cecil Parker, which occurred at his home at Corsham, on January 12, and also the death of Mr. Percy Mortimer, one of the members of the Council representing Cheshire.

We all knew Mr. Parker well. During his long and useful life he had given his ability and services ungrudgingly to the cause of Agriculture. Perhaps one of the finest monuments to his memory is the Eaton Estate in Cheshire, where he was agent to the Duke of Westminster for so many years. During his agency the estate was developed on model lines, and there are here to-day two, if not three, of Mr. Parker's old pupils, who can vouch for his energy, business acumen and profound knowledge.

Apart from this, Mr. Parker gave unstintingly of his services to this Society. He was elected a member as long ago as the year 1876. He came on the Council in 1881, was elected a Vice-President in 1900, and a Trustee in 1915.

In the year 1918 he received the highest honour it is in the power of the Council to confer, namely, the Presidency of this Society. Although no show was held in that year, on account of the Great War, it does not mean that Mr. Parker was merely a figure-head. He interested himself in the great activities then carried out by the Society in the War Emergency Committee and the Relief of Allies Committee.

I think that Mr. Parker occupied almost all the offices open to a member of the Council in connection with the Royal Show. From 1883 to 1885 he was Steward of Implements; in 1885 and again in 1889 and 1891 he was Steward of the Dairy; and from 1893, when the Royal Show was held near to his home at Chester, until 1898, he was Honorary Director of the Show. Even after relinquishing that office he was always only too willing to assist the Society in every possible way, and again acted as Steward of Stock at the show of 1903.

Upon his retirement from the Honorary Directorship he was presented with a piece of silver and an illuminated address as a mark of appreciation for the able manner in which he had carried out the onerous duties at the six shows in question, of which he was Honorary Director.

He served on most of the committees of the Society, and had been chairman of the General Show Committee, the Veterinary Committee and the Selection and General Purposes Committee.

So highly was he regarded by the members of the Council that he was appointed chairman of the Special Show Committee which reported to the Society in the year 1900 on the question of future Royal Shows.

His activities did not stop merely at the work of the show and the administration of the Society's work through its Council and its various Standing Committees, but he wrote articles for the *Journal* in the years 1893 and 1897, one, on the milk yields of two Cheshire herds, having a particular value at that time.

Mr. Parker, who was so well known and respected by us all, can safely be called one of the "old stalwarts" of the Society, who stood by the Council and guided their deliberations with a kind, but sometimes firm, hand. He lived, to the ripe old age of 85, a very full and useful life, and whilst we regret his passing, we can, at the same time, be thankful that the Society has had the services of one who so faithfully assisted to uphold its characteristics and its dignity.

Mr. Mortimer, although having only been elected to the Council in 1928, had always evinced a great interest in the affairs of the Society. He helped in a very practical manner the shows of the Society, at Chester in 1925, and at Manchester last year.

I could not attend Mr. Parker's funeral myself, but Sir Archibald Weigall and Mr. Turner attended, representing the Society. I am sure that you will wish me to send to Mrs. Parker and to Mrs. Mortimer a sincere expression of our sympathy with them. I will ask you to stand in your places for one moment.

Thirty-six new members were elected.

Mr. DAMPIER-WHETHAM, in presenting the JOURNAL AND EDUCATION Committee's Report, wished to say a word on the appointment of a new Editor of the *Journal* of the Society. The Sub-Committee considered the names of those who had applied, and also other names which occurred to them, and out of the number selected two to put before the Journal Committee. The Committee decided to recommend the name of Professor J. A. Scott Watson, of Oxford, an eminent agriculturist known to a good many members of the Society. He understood that yesterday afternoon, after the meeting of the Committee, Lord Cornwallis telegraphed to the Professor, and he (Mr. Dampier-Whetham) was able to say that an answer had been received that morning making it clear that if the recommendation of the Committee was approved Professor Scott Watson would accept the offer. He thought that the Council were to be congratulated on the fact that one of such position, ability and achievement was willing to accept the position of Editor of the Society's *Journal*.

Mr. DAMPIER-WHETHAM, in the absence of Mr. Fred Smith, moved the adoption of the CHEMICAL Committee's Report. He was sure that the members would all be sorry to know that Dr. Voelcker was ill, and would hope that he would soon be well and able to attend the meetings.

THE PRESIDENT: I am sure that we all echo that wish. (Hear, hear.)

SIR MERRIK BURRELL, in presenting the VETERINARY Committee's Report, said that he was glad to be able to tell the Council that the work of the Warble Fly Committee, of which he and Mr. Cecil Warburton were members, as representatives of the Society, had advanced most successfully and that really effective means had been found whereby the warble grub in the backs of cattle could be destroyed. That was not only a matter of very great importance to the leather trade, but was really a great benefit to the agricultural community. He believed the animals never thrived so well when their backs were infested. Since the Committee started its work the leather trade had begun to classify hides according to the number of blemishes in them caused by the grub, and naturally that was having an effect upon the prices that they were prepared to pay the butcher for the hides. As a matter of fact, butchers were beginning to get into the habit of running their hands along the backs of cattle before buying them, to see whether they were affected by the grub. It

was often said that the farmer could not see any direct benefit for himself through the work that was being done, but he thought that the Council would agree that there was a direct benefit to the agriculturist. In any case, it was time that the great loss of a million a year to the leather trade should be stopped.

There was one difficulty in connection with the eradication of the fly, if it ever could be entirely eradicated from this country. It would be difficult to prevent re-infection by cattle from Ireland, having regard to the very large number of store cattle imported every year. He was very glad to say that Ireland was taking a hand. In that country they were usually very progressive, and very often more progressive than we in this country were. He therefore hoped that the difficulty with regard to imported store cattle would be overcome.

He was very pleased to know that the Council had agreed to the Society subscribing £100 towards the work that was being done.

He had a much more important matter to bring before the Council. As members had heard from the report, the Committee yesterday discussed at length the Spahlinger preventive treatment for bovine tuberculosis. It was finally decided that as the work that Mr. Spahlinger had been doing in Norfolk, helped by Major Buxton and his friends, was proving so hopeful, the Society was justified in asking the Royal Veterinary College to investigate the matter and report to the Society as to what could and should be done. Some of those present yesterday, and also to-day, including himself, Lord Daresbury and Sir Archibald Weigall, were placed in a difficult position with regard to what was proposed, as they happened to be Governors of the Royal Veterinary College as well as members of the Council of the "Royal," and therefore were appealing to themselves. That did not make the position easy for them, at any rate, for himself as Chairman of the Royal Veterinary College, and, what was more important, of the Pathological Research Institute attached to the College, that being the department that would have to deal with the matter. In these circumstances it was rather hard to know how to act. He had been thinking the matter over very carefully since yesterday, and the more he thought about it the greater the problem seemed to be. The question was one of world-wide interest. If Mr. Spahlinger had indeed found a preventive for tuberculosis it was one of the biggest, if not the biggest, things that had been done in that kind of work in the lifetime of anybody. If the Society said that he had been successful, or said that he had not been successful, it would be taking on its shoulders an enormous responsibility. Such a responsibility could not be undertaken without a most careful and most thorough investigation. He was quite sure that in order to investigate the problem thoroughly years of work would have to be spent upon it. It was not only a matter of finding out whether animals could be immunised by the treatment from infection for a short period; investigation would have to be conducted to see whether, as in the case of small-pox, re-inoculation was required from time to time to keep the animals safe during the whole of their lives. That would involve a great deal of laboratory work, and not only that, but, naturally, work on a farm scale. During all the time the work must be very carefully supervised, and a very careful note must be taken of everything that happened. Of course, that would all cost money. He thought that the work was so important that the money required would no doubt be forthcoming. Those who were in control of charitable funds might be quite sure that the expenditure of the money was warranted. He thought that the success in Norfolk lately of the Spahlinger system warranted further investigation, but he would point out to the Council that if they undertook the work they would be undertaking a big thing. He would throw out a suggestion which he would like to hear discussed. Probably the best way of dealing with the matter was

for the Council that morning to appoint a small *ad hoc* committee to act in conjunction with the committee which controlled and guided the Pathological Research Institute at Camden Town.

The PRESIDENT asked Sir Merrik whether he was moving an amendment to his own Committee's resolution.

Sir MERRIK BURRELL replied that he was making a suggestion with regard to procedure. He was sorry if he was out of order, and would do whatever the Council liked. The question had come rather suddenly out of the blue yesterday, and he had not had time to think out the best way of dealing with it.

The PRESIDENT: If the Council passed the Report of the Veterinary Committee, perhaps between the present meeting and the next there would be time to work out the details, and then a report could be made to the Council. They could hardly be worked out to-day.

Sir MERRIK BURRELL stated that there was a reason for not delaying too long, and that he had been just about to give it. The Government had within the last day or two started to form an Agricultural Research Council on the same lines as the Medical Research Council. The task of that Council would be to overlook the whole of the research work of the country connected with agricultural matters, and therefore the question of the Spahlinger system would come under its purview. He did not know how soon the Agricultural Research Council would meet to decide what it would support and what it would not support.

The PRESIDENT suggested that Sir Merrik, having first moved the adoption of the Report, should afterwards move, as an emergency resolution, the appointment of a small *ad hoc* Committee to work with the Royal Veterinary College if the College would agree. He thought that that was the best way of dealing with the matter.

Sir MERRIK BURRELL agreed.

Sir ARCHIBALD WEIGALL said he did not want to inflict on the Council all the discussion that occurred in Committee yesterday, for which he was to a certain extent responsible. As he understood it, the question before the Council now was whether or not the unanimous recommendation of the Veterinary Committee, arrived at after a discussion lasting an hour, was to be accepted by the Council. He did not wish to see the Council tying itself up in knots as to details.

With regard to the general principle, although he agreed that the question was a very important and extremely serious one, words had been used by speakers with which he, as Treasurer of the Veterinary College, did not in the least agree. The position with regard to the Spahlinger system was that work had been going on for twelve years, and he had watched it during the whole of that time. As long as ten years ago he sent a man to Geneva who spent two years there watching the work that was going on, and he himself had followed it from the first. The Veterinary Committee of the Society, having heard of the results, said that the matter was, at any rate, big enough for them to consider whether or not it was worth while to carry out a demonstration under their Chief Veterinary Adviser and under the Royal Veterinary College. He thought that they would be on safe ground. All that the Veterinary Committee said was that there was reason to believe, and to be confident in the belief, that at last, after a vast amount of time, trouble and expense in examination and research, a real preventative had been found. He noted that the resolution said "experimentation." That was a word which he had never heard before. He thought that the point was something more in the nature of a demonstration. There had already been experimentation under Major Buxton in the Norfolk experiments, and the stage had now been reached of demonstration under the eyes of veterinary experts and of the premier Agricultural Society of England in the interests of the whole of the stockbreeders in this and other countries.

He saw no obstacle in the way. All that had to be done was to decide the minimum number of calves that their own veterinary experts thought would really be sufficient for a demonstration. As to the number, it was thought that something between fifty and a hundred would be required. He had asked Mr. Spahlinger that morning whether vaccine for a hundred calves would be available at once, and the reply was that there would be no difficulty in supplying it. Therefore all they had to do under the terms of the resolution was to instruct their Chief Veterinary Officer to make the necessary arrangements for vaccinating the calves.

He strongly appealed to the Council to pass the resolution unanimously. He thought that details were matters which could easily be dealt with by any small sub-committee that was appointed.

Mr. ADEANE said that the Council was not in a position to give orders to the Royal Veterinary College. It could only refer the matter to the College for the College to go into it, and express the wish of the Council that it should do so. He thought that the Council should await the reply and then at another meeting the details could be discussed. If they gave orders to the Veterinary College, naturally the College would say that the Society must pay, but the Society could not possibly accept such a responsibility.

The PRESIDENT stated that the Report of the Committee said that a long discussion had taken place on the subject of the Spahlinger system, and the Committee had decided to recommend that the Royal Veterinary College should be asked to investigate the system and report to the Society with regard to it and as to the question of further experimentation. That was very simple. Unless anybody else wished to speak he would put the motion at once.

The PRESIDENT asked Sir Merrik Burrell if he wished to propose anything. Would it not be as well to see the Royal Veterinary College on the subject and bring the matter up at the next meeting of the Council?

Sir MERRIK BURRELL said that there was very much that he disagreed with in what had been said. He did not think that they had begun to see into the depths of the problem at all.

The PRESIDENT pointed out that as the resolution had been carried the question could not be discussed further to-day.

Sir MERRIK BURRELL said that if a report could be obtained with regard to what had been done in Norfolk from the two veterinary surgeons who controlled the work, then an idea could be arrived at as to what must be done and how long the work involved would take, and, further, some idea could be formed as to the financial position. Then the Council could make up its mind.

The PRESIDENT thought that a good deal was being made of a matter that could easily be settled. It was up to the Royal Veterinary College when asked to investigate to say, "Yes, we will," or "No, we will not." If the answer was "Yes," then they could ask for a small committee of the Society to meet them.

Lord HASTINGS, speaking as the mover of the resolution in the Committee, entirely agreed with what the President had said. He wanted to avoid committing the Society to a large expenditure at the present moment, and at the same time he desired the subject to be referred to the Royal Veterinary College. It was a matter of immense importance, and it was urgently necessary that the Society should be thoroughly acquainted with the position. If it was found that the College desired to meet a small committee of the Society, possibly the Society's Veterinary Committee could appoint such a committee without further reference to the Council.

The PRESIDENT was sure that the suggestion would be received most sympathetically.

The PRESIDENT welcomed as new members of Council, Major Jervoise and Mr. E. E. Barclay. He was delighted to see them, and hoped that they would do lots of good work for the Society.

Sir ARCHIBALD WEIGALL asked whether he would be in order in suggesting that a cable should be sent to the Governor-General of New Zealand, who was a late member of the Council, expressing the sympathy of the Society with the sufferers through the earthquake. This was the first meeting of the Council since the tragedy, in which an almost purely agricultural population had been involved.

The PRESIDENT suggested that the question be brought up under "Any Other Business."

Sir ARCHIBALD WEIGALL agreed to defer his remarks accordingly.

Mr. WILLIAM BURKITT stated that he was willing to accept the nomination to act on the Royal Empire Society's Dairy Council, but he would ask that in case he could not make the long journey from the North as often as necessary he should have as deputy the Secretary or some other gentleman.

The PRESIDENT said he was sure the Council would agree to the request of Mr. Burkitt that the Secretary should act as his deputy.

Mr. BURKITT, in moving the adoption of the Report of the DAIRY AND PRODUCE COMMITTEE, said that perhaps Sir Archibald Weigall could give a hint as to how the expenses of the Butter Marking Committee were to be borne. The question was exercising the mind of Mr. Adeane. As Sir Archibald was the Society's representative, he might be able to furnish some information.

Sir ARCHIBALD WEIGALL replied that to-day would be the last sitting of the Standing Committee, and he hoped that the result of its deliberations would be received within the next few days. As to finance, he had asked Mr. Page Thornton, the Secretary, to let Mr. Turner have, when the whole of the business of the Standing Committee was completed, a full account of the expenses, who had contributed, and the amounts contributed. As soon as that information came to hand they would be in a position to approach Mr. Adeane, and he could only be earnest in the prayer and confident in the hope that he would be found in a mollified mood. (Laughter.)

In presenting the RESEARCH Committee's Report, Sir MERRIK BURRELL called attention to the fact that the Committee this year recommended that "Stubble Cleaning: Its Influence on Weed Seeds," submitted by W. A. Jones, of Trinity Hall, Cambridge, and "English Wheat Varieties," by P. S. Hudson, of the School of Agriculture, Cambridge, should each be awarded the Society's silver medal and £10. This year the standard of the essays was extraordinarily high, and the two best could not be separated one from the other. Once or twice during recent years medals had been withheld altogether, but this year the Committee ventured to ask the Council to grant two.

He wished to thank Sir John Russell and Mr. Burkitt for the trouble they had taken in going through the essays and arriving at conclusions with regard to them. It was a big task, and it was extremely kind of them to do it on behalf of the Council.

Lord HASTINGS thought that it would be a pity if the remarkably successful results of the inoculation of lucerne carried out under the aegis of the Research Committee did not receive its due meed of notice. After a vast amount of scientific work on the subject it had been possible a year ago to permit Messrs. Allen & Hanburys to produce, under the licence of the Society, cultures that it was hoped would overcome the very great difficulties that had been encountered hitherto. There was a year of experience behind, and he was sure that the Council, and particularly members of the Research Committee, would be gratified to realise that in one year growers had been able to establish 4,000 acres of successful

lucerne crop as the result of scientific research work. The Research Committee had evinced the greatest interest in the matter, and had financed the experiments out of the resources of the Society.

The PRESIDENT, with reference to the remarks and suggestions made at the last Annual General Meeting, stated that the remarks of Mr. Tom Thomson had already been considered by the Veterinary Committee, and the remarks of Mr. L. C. Tipper had been dealt with in the Report of the Committee of Selection and General Purposes.

The PRESIDENT said that Sir Archibald Weigall had made a suggestion in connection with the earthquake in New Zealand. He could imagine no one more able to move a resolution of sympathy than Sir Archibald, who had himself been a Governor of South Australia.

Sir ARCHIBALD WEIGALL moved that a cablegram be sent to Lord Bledisloe, the Governor-General of New Zealand, expressing the deepest concern of the Council on hearing of the terrible tragedy that had fallen on that country, and their sympathy with the agriculturists and other inhabitants.

Mr. BURKITT seconded the motion.

The PRESIDENT was sure that the Council would agree with the proposition. The Governor of New Zealand was well known to all present. He was sure that the Governor would appreciate the message of sympathy from his old fellow-members which Sir Archibald Weigall had proposed should be sent and Mr. Burkitt had seconded.

The motion was carried unanimously.

On a motion from the Chair, the Seal of the Society was ordered to be affixed to an Indemnity to the Society's bankers in respect of their cheques, which also included a receipt in place of the usual endorsement.

WEDNESDAY, MARCH 4, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The SECRETARY reported that a cablegram had been received from the Governor-General of New Zealand as follows: "Deeply appreciate kind message sympathy.—Governor-General."

A letter had also been received from Mrs. Parker: "Dear Mr. Turner, I would ask you to convey to the President and Council of the Royal Agricultural Society of England my gratitude for their remarks at the service which Mr. Parker was able to give to the Society as long as health lasted, and in whose interests he took the greatest concern. I would ask the President and Council to accept my thanks for their kind message of sympathy."

The following had been received from Mrs. Mortimer: "Mrs. Mortimer wishes to express the deepest appreciation of the kindness and sympathy she has received in her great trouble."

The following were elected as Governors: Victor Emanuel, Rockingham Castle, Market Harborough; Mrs. Victor Emanuel, Rockingham Castle, Market Harborough; H. T. Mills, Langton Hall, Market Harborough; Col. Sir Harold Wernher, K.C.V.O., Someries House, Regent's Park, London, N.W.1; and 31 new members were elected.

Lord CORNWALLIS, in presenting the Report of the JOURNAL AND EDUCATION Committee, said that if any members of the Council had in mind any subject upon which they thought an interesting article for the forthcoming Journal could be written, the Committee would be very grateful for suggestions.

Sir MERRIK BURRELL, in moving the adoption of the VETERINARY Committee's report, said that he did not think he could add anything

useful to what the Secretary had read out in connection with the Spahlinger Tubercular Vaccine. If, however, any member had any questions to ask, he would be pleased to answer them.

The report which Professor Hobday had given on the present position of the notifiable diseases was very satisfactory. It only showed that if the veterinarians of the country were allowed to really get up against the diseases they could do material good. He was afraid that the same could not be said about the diseases which were not notifiable. This only showed the great importance to the country as a whole, and the agricultural community especially, of having proper veterinary surgeons. He said that the slight hope that he had once foreshadowed with regard to financial assistance for the rebuilding of the Royal Veterinary College in a certain direction had not been fulfilled. The Trustees of the Pilgrim Trust had been asked whether they would consider helping, but, after very careful consideration, the Trustees had written to say that they were unable to do so. That made the position as it was before, which was very serious indeed. The Governors had collected somewhere about £53,000 towards the £100,000 that it was necessary to collect to get the £150,000 from the Government. The Governors were continuing to try to collect money. Sir Merrick said that one of the things which struck him particularly during the last three or four weeks in his efforts in that direction was the number of people who seemed to be quite unaware that the Royal Veterinary College was in any need at all; they had always been supplied with a sufficient number of veterinary surgeons, and they never worried themselves as to where they came from. He was quite sure that there were thousands of people in the country who were only just waking up to the fact that there was this great national need. He was not quite in complete despair that the College could be saved. He asked the members present to ask themselves whether they had each individually done all they could in getting other people to do what they could, because he was perfectly sure it was only in that way that they were going to be able to fend off what would not only be a national disaster, but a national disgrace. He said if one could only get into personal contact with people and put the case to them it was quite extraordinary the response that one got.

The PRESIDENT, moving, in the absence of Lord Daresbury, the adoption of the report of the SELECTION AND GENERAL PURPOSES Committee, said he would like from the chair to welcome the new member from Devonshire, Mr. J. F. Shelley.

The Report of the DAIRY AND PRODUCE Committee having been presented, Sir DOUGLAS NEWTON stated that he noticed no mention was made in the report of the position in regard to the Butter Marking Order.

The PRESIDENT replied that the reason no mention was made was because Mr. Burkitt, the Chairman of the Committee, was not present at the meeting on the previous day, and therefore it was left over until next time.

Sir DOUGLAS NEWTON said he thought this was a matter of very great importance to the agricultural community, and it might interest the Society to know what had been going on as far as he could ascertain the situation. The Butter Marking Committee, he understood, had held eleven sittings, and they had published evidence of some 300,000 to 400,000 words. He said it was very interesting, but some of the statements which had been made by those who were opposed to the Order seemed to him in some cases to be very extravagant and very unfair, because they appeared to have gone out of their way to discredit the British dairy farmer. It had been stated that the butter which the British dairy farmer made was so bad that it could only be used for blending purposes. It had been stated that it was hopeless to try to organise the British farmer; he did not want to be organised, and it was

impossible to organise him. It had been stated that the British farmer did not want this Order, but they well knew the facts were that the farmer would not be happy till he got it. He said it was pointed out that administration was going to be very difficult, and he thought one could admit that. It might be impossible to produce a net of such a fine mesh that no fish would go through, but, on the other hand, there was no doubt that if an order was given they would see that they would take a hand in the matter as an organised body, or, at any rate, that reasonable steps were taken to prevent the Order not being given effect to. He said there was another interesting point arising out of this Order, and that was that the Empire Dairy Council had sent out a questionnaire to the medical practitioners and those interested seeking evidence as to the value of butter in regard to health preservation, particularly of children, as a preventive of rickets and diseases of that kind. He understood that steps were being taken to canvass representatives of trade unions and other bodies by means of a direct canvass in certain areas as to how far there was a demand, and how far the consumers would be willing—the working-class consumers particularly—to give a preference to British dairy produce. He thought if a movement of that kind could be set on foot it would, no doubt, be followed up by a request to those people that they should give that preference. He said it might well be that it was the beginning of a movement which would yield a direct and a much-needed and rich harvest to the dairy producers of this country.

The PRESIDENT said everyone must be grateful to Sir Douglas, and he hoped Mr. Burkitt would take up this matter with the Committee.

In presenting the RESEARCH Committee's Report, Sir MERRIK BURRELL referred to the experiments that were to be conducted in Hampshire. The Committee, he said, were setting experiments on foot there, hoping to interest the farmer of the south-eastern and south-western parts of England in the work of the Society. He then exhibited the flea beetle trap referred to in the Committee's report, and, after describing it, said it seemed to be effective.

The PRESIDENT, in moving the adoption of the HORTICULTURAL Committee's report, said they had been trying for some time to see if the Flower Show could not be opened a bit earlier on the first day, because people coming there at eleven o'clock felt a little annoyed if they could not get in before one o'clock. He now hoped that this would be possible, and that it would meet with the approval of some of the visitors who had been annoyed at not being able to get in before one o'clock.

After some remarks by Mr. BORLASE MATTHEWS and Sir DOUGLAS NEWTON on the Committee's decision to award cash in lieu of medals, at the option of exhibitors, the Report was adopted.

The PRESIDENT, in putting the Quarantine Station report before the meeting, said he thought the members ought to congratulate Sir Merrik Burrell on the way that the Station was going. (Hear, hear.)

WEDNESDAY, APRIL 1, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The following were elected as Governors: Major Robert Leatham Barclay, C.B.E., Higham, Bury St. Edmunds; Sir Louis B. Baron, Bart., 93, Park Street, Park Lane, W.1.; Marquis Camden, Bayham Abbey, Lamberhurst, Kent; Viscount Hambleden, Greenlands, Henley-on-Thames; Earl of Jersey, Middleton Park, Bicester, Oxon.; Sir Harry McGowan, K.B.E., Imperial Chemical House, Millbank, S.W.1.; Mrs. Graham Rees-Mogg, Clifford Manor, near Stratford-on-Avon; Captain

Henry Abel Smith, Beaumanor, Loughborough; Earl Spencer, Althorp, Northampton, and 47 new members were admitted into the Society.

In presenting the CHEMICAL Committee's Report Mr. FRED SMITH said he was sure that the Council would wish to congratulate Dr. Voelcker on his recovery from his recent illness. (Hear, hear.) He was sure that everyone hoped that Dr. Voelcker had before him many years of work for the good of agriculture.

Sir MERRIE BURRELL, in presenting the Report of the VETERINARY Committee, said he thought the Committee could congratulate itself on having been able to get Professor Buxton, Dr. Minett, and Professor Wooldridge to form a Committee to investigate Mr. Spahlinger's system, and to carry out a test. Their thanks were due also to Professor Buxton for providing space which was available at Cambridge for the animals that would be required for the test. Yesterday the Committee approved the outlines of the test as being perfectly fair to Mr. Spahlinger and as one that in all probability would satisfy scientific opinion when carried out. It was estimated that the cost of the experiment would be somewhere in the neighbourhood of £500. The test would be only preliminary. If the system came successfully through this test probably a longer one would be necessary subsequently. The Society, of course, was shouldering no responsibility for any further test, but only for the proposed preliminary test. It was considered that the work might be taken on by the Research Committee as part of its liabilities. The Chairman of the Finance Committee had agreed to advance the required money to the Research Committee, the latter Committee paying it back again during a period of years. £500 might seem a considerable sum to spend on a test. But considering the enormous importance of eradicating bovine tuberculosis, if it could be done, it was not a large amount. He felt sure that such a Society as the Royal could not stand aside in a matter of such importance.

The other matter referred to in the Report was the question of a deputation waiting on the Minister of Agriculture regarding the standardisation and control of veterinary biological products. Apparently anyone could sell anything to anybody else at present, and there was no guarantee that tuberculin, mallein, or any of those things were pure or of the required standard, and even that they did not contain dangerous and living bacilli which had no business to be present at all. Many of those products came from abroad, and it was said on the highest possible veterinary authority that there was a danger of the importation of dangerous diseases into this country through biological products which were manufactured in foreign countries. The matter struck the Committee as of sufficient importance for the Minister of Agriculture to be asked to meet two members of the Council to discuss the subject with him.

Major CLIVE BEHRENS, referring to the Spahlinger experiment, asked the Committee to consider whether it would not be as well for the calves to be under six months old. He thought it was proposed in the Report of the Committee that the calves should be six months old. For many years he had carried on experiments of a very similar nature to the "Spahlinger" with his own Shorthorn herd. It was what was known as the Nathan Raw treatment, and the difference really was that the Nathan Raw treatment was given with a vaccine of the dead microbe instead of the living microbe. He started the treatment twelve years ago, and since then had never had a case of tuberculosis in his herd. That was really a very great thing when it was remembered that he was getting from 30 to 40 per cent. of reactors amongst his animals when the treatment began. He wished to bring the matter before the Council because the treatment was started experimentally on the calves, which were given two doses, the first within a week and the next within a month. If that were not done it was found that a certain number of calves were

liable to react to tuberculin up to the time when they were six months old. It was a well-known fact that, however bad its mother might be with tuberculosis, no calf was ever born with the disease in it. It was liable, especially if suckled by its mother, as many cattle were, to develop tuberculosis within a very few days, certainly a very few weeks. Before going on with the experiment he would like to ask the Committee to consider whether the age of six months was altogether suitable. He would like to see the experiment tried at a much earlier age.

Sir MERRIK BURRELL thought the answer was that the three experts who had drawn up the outlines of the test considered that six months was about the earliest age at which animals could be asked to undergo the test proposed. Of course, all the calves which would be used for the test would be tested with tuberculin first and proved to be free from tuberculosis. The animals must be clean to start with, and that precaution would be taken.

Mr. JOHN EVENS, in moving the adoption of the Report of the Stock PRIZES Committee, said that the alteration in the time of judging had received the unanimous support of the Committee.

In presenting the Report of the IMPLEMENT Committee, Lt.-Col. E. W. STANYFORTH said he thought that members of the Council would have heard with the same surprise as he had heard it ten days ago the announcement with regard to Mr. Owen. The wording of the statement was, of course, that Mr. Owen was suspended from his position at the Institute of Agricultural Engineering at Oxford. On first hearing of it he thought that the best plan would be to ask the Selection Committee, and through them the Council, to suspend Mr. Owen as the Society's Consulting Engineer until the question had been gone into and dealt with. The Selection Committee, which met yesterday, considered the matter, and recommended that the Council should suspend Mr. Owen from his position as Consulting Engineer pending the decision of the University authorities. It might be thought that it would be very difficult to carry on the important work that was necessary about this time of year in connection with the new implements entered for silver medals in connection with the Warwick Show, but he wished to tell the Council that everything was going on as usual. The Acting Director, Professor Watson, had agreed to carry on as before. Mr. Wright, the deputy Director of the Institute, would make the required reports and carry out the tests. He wished it to go out from the Council that all the arrangements would be carried out on the same lines as in past years.

The Report of the SELECTION AND GENERAL PURPOSES Committee having been presented, the PRESIDENT congratulated Mr. Adeane on having secured eight new Governors on this occasion. He thought that he had done well himself last time in securing four. He hoped that someone would bring forward ten at the next meeting.

He also wished to welcome to the Council Mr. Walter R. Burrell, who was present, and the Hon. Edward Greenall, who was not able to be present. He thought that Lord Daresbury and Sir Merrik Burrell ought also to be congratulated on having sons on the Council. He hardly liked to refer to them as "chips of the old block" because that sounded rather disrespectful to Lord Daresbury and Sir Merrik, but he was sure that members all hoped that the sons would follow in the footsteps of their fathers in regard to the work of the Council.

In moving the adoption of the Report of the DAIRY AND PRODUCE Committee, Mr. BURKITT said that the letters received from Mrs. Godfrey about sweet cream butter were certainly very striking, but the Committee was of opinion that when the fierce light of practice with science was thrown upon them by some outside body they might not be quite so striking as they appeared to be. The Committee was, therefore, asking the National Institute for Research in Dairying to look into the matter

in order that it should not be lost sight of if there was anything in it.

The point about Cheddar cheese was a very difficult one. As the Council was aware, agriculturists were very much indebted to New Zealand for the great expense that country had put itself to in connection with the Butter Marking Order, and the Committee were very apprehensive lest anything should be done to strike New Zealand on the other cheek, as it were, by refusing the claim of that country to have its cheese described as "Cheddar." Members would know that a very great amount of cheese made in Scotland was justly described as Cheddar and, as often as not, beat English Cheddar when it came into competition with it. The Committee thought that this New Zealand cheese should not be described as being more than of a Cheddar type or as New Zealand Cheddar, and that it certainly ought not to be described by the word Cheddar alone. Apparently, some claim was made that the cheese was not true Cheddar in its manufacture. It was for that reason that Dr. Voelcker had volunteered, and the Committee had asked Mr. Alec Todd to give them information as to what they would consider true Cheddar of English manufacture to be. When that information came to hand the Committee would report further. It was a somewhat difficult question.

With regard to the Butter Marking Order he would only say that patience was a virtue, and the Committee would virtuously await the publication of the Order. If the Order were published, as they certainly hoped it would be, the Committee would proceed a good deal further with the matter and would not allow it to drop.

LORD STRACHIE said, as the representative of Somerset on the Council, that he was not entirely satisfied by what the Chairman had said, and he hoped the Committee would go further into the matter. Owing to an urgent engagement he had not been able to be present at the Committee meeting yesterday, otherwise he would have taken the matter up then. He hardly thought that Cheddar made in the Dominions could be compared with Cheddar made in the United Kingdom. If it were impossible to prevent this particular cheese being called Cheddar he would suggest that the Committee should do something to see that it should be called New Zealand Cheddar, which was its proper description.

MR. BURKITT assured Lord Strachie that that was the intention of the Committee when they had been advised on the matter.

Moving the adoption of the RESEARCH Committee's Report, in the absence of the Duke of Devonshire, Sir MERRIK BURRELL was glad to be able to report that, thanks to the work carried out by Lord Radnor, Mr. Troup and Sir John Russell, the Research Committee had found it possible to institute research into some problems of considerable local importance in Hampshire which would be closely connected with the Royal Show in 1932. He hoped that the fact that the experiments were being carried out in that neighbourhood would prove to the farming community in the South-East of England that the Royal was looking after their interests in more ways than one. If any member of the Council was in doubt as to the exact position regarding the supply of electricity in rural areas and would ask the Secretary for a copy of Mr. Borlase Matthews's memorandum, which he had kindly presented to the Committee yesterday, he would get a good deal of information on the question.

SIR MERRIK BURRELL, in presenting the QUARANTINE STATION Committee's Report, said that one more year had passed satisfactorily in the running of the Station. Last month the President had been kind enough to give him a word of praise for the running of the Station. While thanking the President for that word of praise, it would not be fair if he allowed it to pass without saying that about 1 per cent. of the credit was due to himself and the other 99 per cent. was entirely due to the staff who ran the Station. Were it not for the excellent work put in by Mr. Turner

and Mr. Lee at the office, and Ritchie and the men who worked with him at the East India Docks, nothing that he (the speaker) could do would be of the slightest avail. Those men had run the Station with the greatest loyalty and accord in the past three years, and it was entirely due to them, not to himself, that it was run so well. He regretted that the net cost was up this year in comparison with last year. This was due to a falling-off of 100 in the total number of animals going through the Quarantine Station. Therefore, the overhead cost was up. That was not the fault of those at this end. It was the misfortune of agriculturists all over the world, especially in Australia, to be so short of funds that they could not afford to come to this country and buy pedigree stock. It would be noticed that the report said that the Empire Marketing Board grant amounted to £3,250 per annum. It was extremely satisfactory that the Quarantine Station had been run for three years at about £100 more than the amount of the annual grant. Eighteen hundred and thirty-two animals had been put through the Station at a net cost of considerably under £2 per head to the Empire Marketing Board. He thought the Council would agree that if the Station could ensure the export of pedigree cattle to the Dominions at an annual insurance of under £2 per head to those who sent them, it would be a very cheap premium.

Complaints had been received from Scotland that the Quarantine Station was not sufficiently large, and the Society was urged to extend it. He ought to say that the complaints were not borne out by the facts. Trouble occasionally arose when the free freight boats were going to South Africa. The Union Castle Line seemed not to be able to give any but rather short notice when those boats were going to sail. That occasionally caused difficulties with people who wished to export animals by those boats. It was not the fault of the Station, and the enlarging of the Station, or rather the building of a new one (because it would be quite futile to enlarge the present Station and it would be necessary to have an entirely new unit), would not be justified, seeing that the present figures showed that the number of animals exported had fallen off by 20 per cent, in comparison with the figures for last year.

Sir ARCHIBALD WEIGALL said that the Council would agree that the record of the Station obviously meant that Sir Merrik Burrell, as Chairman, had been mainly responsible with Mr. Turner and those in the office. But he wanted to ask, if it were not too unusual, that the special thanks of the Council should be given to Ritchie. When the appointment had to be made he remembered being enormously impressed with the man's individuality. They had had three years' experience of Ritchie, who was one of those rare characters who dignified the whole of their work by a devotion which really became almost a religion and ensured to those concerned the enormous advantage of all that extra devotion that counted for so much in these days. If it was usual he would ask that the best thanks of the Council should be sent to Ritchie, because it was impossible to exaggerate the value of that man's work in the carrying on of the Station.

The PRESIDENT suggested that Sir Merrik Burrell, as Chairman of the Quarantine Station, should tell Ritchie that the Council desired to thank him very specially. He thought it would be better if it came from Sir Merrik as Chairman than if an actual resolution were carried by the Council.

Sir MERRIK BURRELL replied that he would be delighted to do that.

WEDNESDAY, MAY 6, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

Fifty-two new Members were admitted into the Society.

In presenting the BOTANICAL AND ZOOLOGICAL (FORESTRY AND ORCHARDS) Committee's Report, LORD HASTINGS wished to draw the attention of the Council to the extremely unsatisfactory number of entries received for the Plantation competition. As members knew, the Society offered silver and gold medals for the plantations, and in the past many of the competitions had been highly satisfactory, and many entries had been received. Last year, owing to a very heavy gale in the South-West country, which occurred in the previous winter, the entries were somewhat reduced. It had been hoped that this year, having regard to the fact that the county of Shropshire was well known for its timber, there would be many more entries. The Committee had decided to extend the date for entries to May 30th, that being the latest possible date owing to the necessity of getting the itinerary arranged. He very much hoped that members of the Council from the important counties of Shropshire, Staffordshire, Cheshire, and Lancashire who found it possible to interest landowners in possession of woodlands would take the opportunity of doing so. It was a thousand pities that the competitions should not be well filled. As had been stated, there were only twelve entries, and that was a very poor number to receive in so many classes. If members of the Council could help in the matter the Committee would be very grateful.

Mr. JOHN EVENS, moving the adoption of the STOCK PRIZES Committee's Report, said there was a rather important matter to which he wished to refer. The Council would remember that at the last meeting it was agreed that the judging of cattle, sheep and pigs at the Warwick Show should commence at ten o'clock in the morning instead of at nine, with certain exceptions at the discretion of the Honorary Director. On the advice of the Honorary Director, whose absence to-day he was sure they all regretted, and for whom they wished a speedy recovery, the Committee recommended that the judging of the following classes should commence at nine o'clock instead of ten: *Cattle*, Dairy Shorthorns, British Friesians; *Pigs*, Large White, Middle White and Large Black; the judging of other classes to commence at ten o'clock.

The PRESIDENT: I am sure you will all agree that we should express our regret that Mr. Roland Burke is not able to be present to-day, and also should express the hope that he will soon be quite well. (Hear, hear.)

Sir DOUGLAS NEWTON suggested that the Sub-Committee appointed to prepare the schedule of prizes for the Southampton Show should be requested to consider the desirability of incorporating in the Schedule for the Show for next year some prizes (a new class) for pigs, based on some pig-recording scheme. He thought that that might be done with advantage. He would suggest that the Sub-Committee should get into touch with the Cambridge University Department of Agriculture and make some inquiries as to the working of the pig recording scheme in operation in East Anglia, which had worked very satisfactorily for the past three years. The purpose of the scheme was to try to obtain an accurate record of the achievements of pigs in the area, to eliminate guesswork, measure the efficiency of the herds, and weed out unprofitable sows. No greater service could be rendered to the Pig Industry than was rendered by such a scheme. Already some rather startling results had been made public. The average number of pigs per sow per annum in this country was, roughly, eleven to twelve, but in Continental countries the average number of pigs in recorded herds (and the great majority

of herds in other countries were recorded or about to be recorded) was fifteen or sixteen per sow per annum reared pigs, sold commercially in the market. The discrepancy and difference between the English average production (not specialised production) and the average of the same article in other countries was rather disquieting. He therefore ventured to ask whether it was possible for the Society to get into touch with the Cambridge authorities with a view to seeing how the scheme worked and whether a prize could be given to encourage pig recording. If a competition could be constituted where the qualifying test was not merely a well-bred animal, very pleasing to the eye, but was linked up with actual performances and achievements measured in terms of commercial success and sales of pigs, it would be, he thought, a very good thing. That was what mattered to the farmer. The best pig in the world was no good to the farmer unless he could turn it into money fairly quickly, and he hoped that something could be done in the direction that he had indicated.

Mr. EVENS was sure that the Sub-Committee would be very pleased to consider the suggestion.

In presenting the SELECTION AND GENERAL PURPOSES Committee's Report, Lord DARESBURY expressed the pleasure of the Council at hearing that His Royal Highness the Prince of Wales was going to visit the Show. His presence would make a great difference, and they might look forward to the Show being very successful.

The PRESIDENT: I see that there is a new member of the Council present to-day who was not at our last meeting. On behalf of the Council I welcome Mr. Edward Greenall.

The PRESIDENT stated that he could not possibly attend the meeting at the Ministry of Agriculture on the 13th to discuss the question of the extermination of the grey squirrel as he had to go to the quarterly meeting of the Leicestershire County Council. He did not know whether there was an expert on the grey squirrel present who could be nominated to attend in his place. They did not have many grey squirrels in Leicestershire. He would propose that Sir George Courthope, or, failing him, Sir Merrik Burrell, be asked to attend, if possible, in his place.

Moving the adoption of the RESEARCH Committee's Report, Mr. DAMPIER-WHETHAM said there were two points he would ask the Council to observe. The first was that £200 had been saved owing to the late decision of the beet sugar factories to find funds for the current year to carry on trials. He regretted that the Chairman of the Finance Committee was not then present, because he had been looking forward to receiving some praise from him.

The second point was that it would be a matter of pleasure to them all to know that the inoculation of lucerne was still growing. Whereas at this time last year 5,000 cultures had been sold, 7,000 cultures had been sold up to date this year. That meant that something like 3,500 acres of lucerne had been subjected to the process of inoculation.

Sir MERRIK BURRELL said that the £200 for sugar beet trials had been saved through the kindly intervention of the Minister of Agriculture, following a letter from the President. He would suggest that a further letter should be sent to the Minister over the signature of the President thanking him for his intervention.

The PRESIDENT said that if it was the wish of the Council that he should act on Sir Merrik Burrell's suggestion he would do so.

This was agreed to.

In the absence of Mr. Adeane he would thank Mr. Dampier-Whetham and the Research Committee for saving £200. (Cheers and laughter.)

WEDNESDAY, JUNE 3, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The PRESIDENT: Gentlemen, before we begin the business of the morning, I am sure that you would like me, on behalf of the Council, to congratulate Sir William Dampier-Whetham on the honour bestowed upon him by His Majesty the King. Sir William has been a nominated member of the Council since 1921, and we are delighted to think that one of our members has been so honoured. (Applause.)

SIR WILLIAM DAMPIER-WHETHAM: Mr. President and Gentlemen, I thank you very much.

The Marquis of Zetland was elected a Governor and 103 new members were admitted into the Society.

It was resolved, on the motion of Mr. ADEANE: "That the Secretary be empowered to issue to any duly nominated candidate for membership to the Society, on receipt of the annual subscription, a badge admitting the candidate to the same privileges as a Member during the forthcoming Show at Warwick, the formal election of such candidate to be considered by the Council at their next ordinary meeting."

In view of the attendance at the Council meeting of a deputation from Newcastle-on-Tyne, item No. 12 on the agenda—report of the Committee of Selection and General Purposes—was, at the suggestion of the PRESIDENT, taken next.

LORD DARESBURY moved that the Report be received and adopted. He was sure that he was only voicing what all present felt in welcoming the Newcastle deputation now in attendance. They were not all strangers. The Lord Mayor and the Town Clerk and Alderman Gillespie would be remembered very well from the last time that the Royal Show was held at Newcastle-on-Tyne. The Society had held most successful shows there, and the success was greatly due to the hard work that the Town Clerk and those connected with him had put in. They were delighted to see him again. He was sure that they could hope for a very successful show in Newcastle in 1935. (Applause.)

The LORD MAYOR OF NEWCASTLE-ON-TYNE stated that the deputation had been instructed by the City Council to extend a cordial invitation to the Society to hold the Royal Show at Newcastle in 1935. They had very lively and felicitous recollections of the visit in 1923. The Royal Show had been held at Newcastle fifteen years before that, i.e., in 1908, and also, he thought, about fifteen years before that. The last visit was, he believed, in point of numbers and financial result a record. He could only say that what they had done in the past in Newcastle he was sure they would do in the future if the invitation was accepted. (Applause.) The conditions would be very similar to those in 1923. The Town Moor of over 1,000 acres would be available for the purpose of the show, and would be very well served by electric trams, omnibuses and other modern methods of transport from the central railway station, which was only a mile distant. In the opinion of the deputation the local conditions were ideal, situated as Newcastle was in the heart of the industrial centre. Within fifteen miles there was a population of over a million people, and some estimated that in a reasonable period of time it would have increased to close on two millions. In 1923 the City Council voted £2,500 for the purpose of the Show, and at the same time issued an appeal for subscriptions, which raised £10,000. In addition the Council had spent on the ground in making provision for gas, water, electric light, etc., £7,500, so that the total expenditure of the City Council in connection with the Show was £10,000. (Applause.) As he had said, they were prepared to do in the future what they had done in the past. Newcastle and the Tyneside had been passing through a period of distress since the war, but it was significant that as the debit balance

increased and the approach of the broker's man and other insidious persons grew nearer the spirit of the North in connection with the occasion rose higher. When what was required in the way of finance from the district was explained prominent members of the City Council had said that there would be no trouble at all in doing in the future what had been done in the past. (Applause.)

He had the privilege of being Sheriff of the City and the Member of Parliament for one of the divisions of the town in 1923. In recommending the Council to send the deputation he pointed out that not a little of the success of the Royal Show in 1923 was due to the fact that he was Sheriff at the time. (Laughter.) The office of Sheriff was only held once, but there was no reason why the City Council should not see to it that he was in the position of Lord Mayor if the Show was again held at Newcastle, so that he could make doubly sure that it would be a success. (Laughter and applause.)

In the name of the City Council he and his colleagues who were present extended a most cordial invitation to the Society to hold the Show at Newcastle in 1935. They believed that such a step was calculated to enhance the immense value of the Society and its organisation, and would prove a substantial advantage financially and in other ways to the whole of the North-east of England. (Applause.)

The SHERIFF OF NEWCASTLE was sure that no words were necessary from him to emphasise the fact that if the invitation was accepted those members of the Society who attended the Show would be warmly received. The Lord Mayor had put the case clearly and well, as he always did. As members had been reminded, Royal Shows held at Newcastle had been a success, and he was sure that the Show in 1935, if held there, would be equally successful. After London, Newcastle was the first city in the country.

The Lord Mayor, who had spoken rather optimistically, perhaps, with regard to finance, had informed the meeting that the City Council would do exactly what had been done before. So far as money was concerned, he could assure them that there was very little of it about in Newcastle at the present time, but he hoped that there would be more in 1935. He had great pleasure in endorsing the remarks, and he hoped that the invitation of the City Council would be accepted.

Mr. J. R. ANDREWS said that he represented an ancient body of people in Newcastle called Freemen of the City. They held rights over the Town Moor, and were charged with the cultivation and improvement of that great common. He did not say that Newcastle was the greatest city in the world, but he did say that the Town Moor was the greatest open space, and he cordially supported what had been said. That vast area would be at the disposal of the Society without charge, and they would do all that they could to make the Show a great success.

Mr. WILLIAM BURKITT said that as a member of the Society's Council from Durham he heartily supported the invitation. Unfortunately, Mr. George Rea, who was the member of Council for Northumberland, had broken his leg. It would delight him on his sick bed to hear that the invitation had been accepted. He (the speaker) said that Armstrong College was his alma mater, and, living as he did in the county of Durham, he knew the depression that existed in the North-east. It was heartening to find that the Corporation of the great city of Newcastle-on-Tyne had given the invitation, because it showed that evidently they did not think that the cloud of depression which hung over the district would be permanent. He hoped that the Royal Show, if held at Newcastle, would be as great a success in 1935 as it was in 1923. If a large sum of money could be made in such places, they could hold shows in the smaller and more agricultural areas.

The PRESIDENT: I am sure that you all agree with what Lord Dares-

bury said. We are delighted to see old friends from Newcastle, and we welcome new ones. I put it to you that the invitation from Newcastle-on-Tyne to hold the Royal Show there in 1935 be gratefully accepted.

The motion was carried by acclamation.

The PRESIDENT: I thank you very much indeed, my Lord Mayor and gentlemen.

The LORD MAYOR: Mr. President, I would like on behalf of the deputation, to thank you very cordially for the very pleasant hearing we have received and for the abundant success of our mission. We know that shortly coaches will be drawn up outside the doorway to take you to your duties elsewhere, so we will depart. (Laughter.)

The PRESIDENT: I hope that you will go too, my Lord Mayor and gentlemen, and I wish you a good time.

The deputation then withdrew.

Lord DARESBURY proposed that the cordial invitation given to the Society to hold its Show at Derby in 1933 be accepted. He said that they had very happy recollections of Derby, as of Newcastle. The Derby Show in 1906 was most successful. It was his first show as Honorary Director, and they had had a very good time. He hoped that the invitation would be accepted.

Mr. ROLAND BURKE seconded. He was sure that if the Duke of Devonshire had been present he would have said a few words in support of the invitation. As Lord Daresbury had said, they had had a most successful show in Derby, and if the Council accepted the invitation the news would give very great satisfaction and would be received with enthusiasm, not only in the Borough of Derby, but also in the whole county. He was certain that the Society would receive a most cordial and warm welcome in 1933, and that everything possible would be done to make the show even more successful than shows held in Derby in the past.

The PRESIDENT: I put it that the invitation from Derby also be gratefully accepted.

The resolution was carried by acclamation.

Mr. FRED SMITH, in presenting the report of the CHEMICAL Committee, wished to draw attention to the fact that deliveries of manures and feeding stuffs had very much improved during recent years. There was not so much adulteration, and the bulk was more often up to the standard laid down by the analysts. The Committee were doing a good work for some of the members, as they had obtained no less than £594 17s. 6d. and £75 for breeders of stock who had unfortunately used linseed cake containing castor bean. He therefore thought that the Committee was justified in bringing the fact to the notice of the Minister of Agriculture that it was very dangerous to feed castor bean, and ought to be avoided.

Lord HASTINGS, in moving the adoption of the Report of the BOTANICAL AND ZOOLOGICAL (FORESTRY AND ORCHARDS) Committee, said that further efforts to recruit entries for the Plantation Competition had only met with very moderate success. They had met with some success, but it was disappointing to think that a part of England famous for its timber production should fail to produce a greater number of entries than had had been received. He gladly admitted that the entries received were likely to prove of a very high quality, but the numbers were deficient.

If the president would allow him to do so, he would like to tell a tale. They had heard just now from Mr. Smith, Chairman of the Chemical Committee, that the adulteration of cattle feeding stuffs was on the decrease, but he would ask members to wait until they heard the risks that they themselves ran. The other day at Cambridge some dairy butter was on the dining-room table in a certain college, and when it was cut a strange foreign body was disclosed. On examination it was found to

be an insect. Within a few yards of the particular dining-room there was the collective wisdom of the world, and there was nothing more natural than that strange foreign body should be sent to Mr. Warburton, the Society's Zoologist, and it was found to be a tick. Happily, it was not usual for ticks to be made up in dairy butter. But that was only half of the tale. What was more important was that the particular tick was entirely unknown in Western Europe. It was an Asiatic tick, familiar on the eastern borders of Russia. Never before had it reached Western Europe, and still less England, but, none the less, not to be deterred, it arrived dead in the dairy butter. He regretted that their friend Sir Douglas Newton was not present, because it would have supplied him with additional ammunition which would be very useful. It was fortunate that the tick should have appeared at Cambridge, the one place where its immediate identification was assured. If it had appeared on the table of a dining-room elsewhere it might have been thrown away, nothing more being heard of it. The butter was shown to be blended butter from Russia. He thought that the tale might interest the members of the Council. While it was amusing, at the same time it was of a rather serious character.

Mr. F. H. THORNTON: If ticks, why not the live bacteria of tuberculosis?

Mr. BURKITT, in presenting the Report of the DAIRY AND PRODUCE Committee, said a new county championship competition for butter-making had been started this year, and he was glad to say that there was an excellent entry from eight counties.

The question of Cheddar had come up on the complaint of Cheddar manufacturers that something inferior from New Zealand was being sold as Cheddar cheese. Most careful inquiries had been made, and they were greatly indebted to Dr. Voelcker for his thorough investigation, and also to Mr. Alec Todd, of the British Dairy Institute and a leading authority on cheese. It had been found that the cheese which came from New Zealand was by no means inferior. But as a matter of fact it was made largely from the milk of Jersey cattle, and any practical cheese-maker knew that it was difficult to make good cheese from milk which was very rich in butterfat. Great care had to be taken, or a lot might be lost in the making. New Zealand had to some extent standardised the cheese by taking away a little of the butterfat. The accusation had been made that it was inferior, but analysis had shown that New Zealand cheese was as rich as our own in butterfat, and that the public were not being defrauded in any way. Cheddar cheese had originally come from Somersetshire, as members knew, but now there was probably almost as much made in Scotland as in Somersetshire, and more in Canada and New Zealand, as many present knew from experience in restaurants. To his mind there was no doubt at all that the best English Cheddar was unrivalled, and neither New Zealand nor anywhere else could equal it. Although English manufacturers were pressed very hardly by Scottish friends, it was still the best. New Zealand cheese was good cheese, and if it was properly labelled on all occasions as New Zealand Cheddar and not sold as English Cheddar he did not see that exception could be taken to it.

He regretted to say that there was nothing to report on the question of the Butter Marking Order. It was three or four months since the Committee finished its inquiries, but nothing had been done. It seemed as if there was delay with the idea of getting Siberian butter into this country, ticks included, and selling it as the best English butter. The rather serious story told by Lord Hastings strengthened the contention that there was need for something to be done as quickly as possible to protect English butter.

Sir ARCHIBALD WEIGALL said the question was an extremely important

one. Could the Council ask for a decision with regard to the application for a Butter Marking Order?

The PRESIDENT asked whether the members would like a letter to be sent by the Society to ascertain whether anything could be done.

Sir ARCHIBALD WEIGALL thought that such a letter should be sent, and that attention should be drawn to the fact that there had been a delay of more than three months.

The Report of the RESEARCH Committee having been presented, Lord HASTINGS wished to draw particular attention to the invitation from the Norfolk Agricultural Station which was issued to the Council generally for Thursday, July 30th, the day following the next Council meeting after the Show. If members of the Implement Committee could see their way to come now that the drill trials had been brought to an advanced stage, it would be very gratifying, he need hardly say, to Captain Buxton and himself and members of the Executive Committee. They would be delighted to have the opportunity of entertaining members of the Council at luncheon, and would arrange transport to the farm and back.

For the ensuing year the Trustees of the QUEEN VICTORIA GIFTS FUND report that they have made a grant of £180, to be devoted to gifts to candidates as below, the distribution in each class to be left until after the election to pensions by the Royal Agricultural Benevolent Institution:

Male candidates: Six gifts of £10 each; Married couples: Three gifts of £20 each; Female candidates: Six gifts of £10 each.

THURSDAY, JULY 9, 1931.

SIR ARTHUR HAZLEBICK, BART. (President), in the Chair.

In connection with the isolation of live stock which had come to the show from the area round West Wycombe which had since been placed under restrictions owing to an outbreak of foot and mouth disease there, the PRESIDENT said he thought Members of Council would like to know that the Honorary Director, Mr. Cyril Greenall, and himself went round beforehand and chose a place convenient for isolation. They also again pressed very hard that, if such a lamentable occurrence did happen, the animals might be allowed to be sent directly home to the Exhibitors' own area for isolation there. Some of the officials at this end had now come round, but headquarters still refused to adopt that attitude. As the Council knew, Lord Daresbury had pressed for this in the past, and it was to be hoped that one day the Ministry of Agriculture would agree that the people on the spot knew which was the best way of dealing with the matter. If only that course had been taken on the present occasion, the animals from the area might at once have been transported back home and the Society saved the trouble and expense of erecting special isolation boxes.

In connection with this, the work by the Officials and the Contractors was past all praise. So efficiently was the work done that all the animals concerned were out of the showground by 10 o'clock on Wednesday morning.

It was resolved, on the motion of LORD HARLECH, seconded by COLONEL STANTFORTH:

That the best thanks of the Society are due and are hereby tendered to:—

- (1) The OFFICIALS of THE GENERAL POST OFFICE for the efficient postal arrangements in connection with the Show.
- (2) The CHIEF COMMISSIONER OF POLICE for the efficient services rendered by the detachment of Metropolitan Police on duty in the Showyard.

- (3) The CHIEF CONSTABLE OF WARWICKSHIRE for the efficient Police arrangements in connection with the Show.
- (4) The ST. JOHN AMBULANCE BRIGADE, No. 3 District (Warwickshire Corps), for the efficient Ambulance Arrangements at the Show.
- (5) Messrs. BARCLAYS BANK LIMITED, Local Bankers, for the efficient services rendered by their Officials.
- (6) Messrs. MERRYWEATHER & SONS, LTD., for the provision of Fire protection appliances, and for the efficient arrangements made by them in connection with the Fire Station in the Showyard.
- (7) The LEAMINGTON AND WARWICK ELECTRICAL CO., LTD., Leamington, for providing Electric Light for the Hardsmen's coffee bars, the Members' Tent, and the Dairy.
- (8) Messrs. HEWITT & Co., LTD., Solihull, Warwickshire, for providing Floral Decorations at the Royal Pavillion.
- (9) The LEAMINGTON CORPORATION, for providing seats round the Band Stand.
- (10) The YOUNG MEN'S CHRISTIAN ASSOCIATION, Birmingham, for providing Reading matter, Writing materials and Refreshments, and for organising Welfare Work and Sports for Stockmen and Grooms in the Showyard.
- (11) The ARMSTRONG-SIDDELEY MOTORS, LTD., Coventry, and the MIDLAND AUTOCAR CO., Leamington, for the loan of Cars for use during the Show.

Letters of thanks were also ordered to be sent to various other individuals and firms for assistance kindly rendered, and for the loan of articles for the purpose of the Show.

Mr. BURKITT said that as neither the President nor any of the other senior Members of the Council were able to go to Edinburgh, it had fallen to his lot to represent the Society at the recent Centenary Show of the Highland and Agricultural Society. He would like to report that all honour had been done to the Royal Agricultural Society. The Highland Society were exceedingly kind, not only to himself but also to his wife, and everything had been done to make their visit a pleasant one. He suggested that a vote of thanks be passed by the Council to the Highland and Agricultural Society for the courtesy accorded to him as the R.A.S.E. representative.

Bearing in mind the Royal Agricultural Society's experience at Doncaster, he was able to condole with the Highland Society on the absence of live stock from their show, but he was also able to congratulate them on their success. They had a very fine show in what was left of the exhibits.

Mr. Burkitt's suggestion was cordially agreed to.

Proceedings at the General Meeting of Governors and Members,

HELD IN THE LARGE TENT IN THE SHOWYARD AT WARWICK,

THURSDAY, JULY 9, 1931.

SIR ARTHUR HAZLERIGG, BART. (PRESIDENT), IN THE CHAIR.

The PRESIDENT, in opening the meeting, said that, before commencing the actual business, he thought he was voicing the wishes of all Governors and Members, and of the Council, too, when he proposed that they should send to the Highland and Agricultural Society of Scotland a message of congratulation on their centenary this year. While they sympathised with them for having no cattle or other stock at the Edinburgh Show, owing to foot-and-mouth disease restrictions, they of "the Royal" were filled with pleasant envy that a Society could, even in those circumstances, have a really successful show. (Applause.) He felt that it was only fitting at that general meeting of the Royal Agricultural Society of England that they should send a message of hearty congratulation to the Highland Society upon their success at Edinburgh. He would move a resolution that that be done.

The Directors of the Highland Society very kindly invited himself as President and other Members of Council to Edinburgh but, unfortunately, neither he nor the Honorary Director had been able to attend. The Council that morning had, however, received a report from one of their number who represented the Society, and who was extremely gratified by the reception accorded him. He (the President) would like on behalf of their representative to thank the Highland Society for all that they had done for his comfort and to make his visit interesting.

Mr. ROLAND BURKE (Honorary Director) seconded the resolution, which was unanimously carried.

The PRESIDENT, continuing, said it was thirty-nine years since the Royal Show was last at Warwick, and it was then held upon the site of the show to-day. The length of his speech at that meeting need not be measured by the length of the period of time that had elapsed since the last Royal Show there in 1892, for he proposed to make his remarks brief and not to weary them with details as to the show or on agriculture in general.

Later on he would call upon certain members to propose votes of thanks to the Mayor and Corporation of Warwick and to the Local Committee for the most excellent arrangements they had made, and for all the good work they had put in, which had enabled the show to be staged there and to make it the success it undoubtedly would be; but he would like at once to say how grateful he was to all of them, and to thank them all very much indeed.

All would agree that the Royal Show had seldom been staged in more beautiful surroundings than they had in the Castle Park. They were in the very heart of England, in the midst of a great hunting country and a great farming country.

Lady Warwick and the Warwick Estate Trustees had kindly placed the site at the disposal of the Society, and the Local Committee had been exceedingly successful in raising the requisite funds to equip the site with all the services required by a huge show of that character, and to them the Society were very grateful.

The holding of the Royal Show at Warwick this year was unique in one particular respect, because they were celebrating the centenary of the Warwick County Society. On occasions of that kind it was usual for the Society concerned to endeavour themselves to make what he might call a "big splash," in the hope that by so doing they might swell the funds of their own Society; but some few years ago the County Society approached the R.A.S.E. and asked them if they would, as the premier Agricultural Society, celebrate this centenary with them by holding the Royal Show at Warwick. This meant, of course, that the County Society entirely suspended and withheld their own show for this year, and the parent Society did feel honoured by the County Society, which, he believed, curiously enough, was older than the parent, asking them to celebrate the event with them and for them.

This was the third occasion on which the Royal Show had been held in Warwick, and on the two previous occasions a very considerable profit had been made. It was very interesting to read about the visits of the Society to various cities and towns in the country, and to see how the results fluctuated. On some occasions quite a decent profit might be made, whilst on a return visit a loss of equal proportions was sometimes incurred.

Warwick had had two successful Royal Shows—in 1859 and 1892. That record must on no account be spoiled, and he did earnestly express the hope that when the final figures relating to the present exhibition were obtainable they would show just as substantial profits for this show as the previous shows there had done.

It was something for a comparatively small town like Warwick to be

able to say that each Royal Show they had had in their midst had been a successful and profitable one. It was only due to the energy, ability and hard work of all those concerned in the local work of organisation, advertising, etc., that this could be brought about.

He did not think it fair to burden those present with figures, giving a comparison with the last show held there thirty-nine years ago. Everything, of course, had progressed, but it was remarkable that, in spite of the growth in many departments of the show, it was possible to stage it on the same site and in the same area as it was nearly forty years ago. Nothing was more tiring than walking round and inspecting exhibits in a large showyard, and it was the wish of the Council and those concerned in the organisation to make the ground as compact in its outlay as possible.

He would, however, just like to say that the total prize-money offered at the show was £15,200. There were 82 classes for horses, 146 for cattle, 11 classes for goats, 88 classes for sheep, 68 classes for pigs; poultry had 109 classes, butter had 5, cheese had 14, cider 4, and wool 17.

The entries were well up to the average. Horses had a larger entry than last year. Cattle were about the same, sheep smaller and pigs larger in numbers.

Although, naturally, they always liked to get a good entry in the various classes, he thought members would agree with him that it was not the numbers that counted in this case, but the quality of the animals coming before the judges, and there was nothing to be anxious about on that score in connection with the present Show.

There was a somewhat remarkable coincidence in connection with that Show, for it was after the visit to Warwick in 1892 that Sir Jacob Wilson, the then Honorary Director, expressed his desire to resign the position; whilst to-day Mr. Roland Burke celebrated the first occasion on which he had been Honorary Director of the Show. He was not one of those who thought that no change was ever a good thing; still less was he one of those pathetically thoughtless people who imagined that all changes must necessarily be for the better. No one who had been connected with the Royal for the last 25 years could think it was a good thing when Lord Daresbury decided to give up, but he thought they were also all agreed that if a change had to come, the Society could not have made a better choice than they did when they appointed Mr. Roland Burke. He would like to congratulate him on the splendid result of his hard work. (Applause.)

Thanks to Mayor and Corporation.

Lord HARLECH proposed that the best thanks of the Society be tendered to the Mayor and Corporation of Warwick for their cordial reception of the Society. He thought he was right in saying that that was the first occasion on which they had been welcomed by a Corporation, the head of which was graced and honoured by a lady Mayor. The Society were deeply indebted to Lady Warwick and the Corporation for the energetic work they had put in in assisting the Society to make the Show the success it was. In spite of the drawbacks of foot-and-mouth disease, he did not suppose they had had a better show of cattle, produce and implements than on the present occasion, and they could only hope that the result would, as the President had said, prove to be a profitable one. They had had the weather in their favour. It was through the influence of Lady Warwick that those lovely grounds had been placed at the disposal of the Society, and the thanks of the meeting were due to her, and also to the Corporation, for all they had done for the success of the Show. (Applause.)

Lieut.-Col. E. W. STANFORTH had very great pleasure in seconding the motion. The Society were indebted always to mayors and corpora-

tions of the different towns visited by the Show, but he thought that all those present would agree that never had they surpassed in any way the co-operation and work of Lady Warwick and the Corporation in connection with the present Show. He could well remember the last Show in Warwick, and he only trusted that this one might turn out as profitable. He feared, however, that in these hard times one could hardly hope for that.

The vote of thanks to the Mayor and Corporation was heartily accorded.

The MAYOR (the Countess of Warwick), in responding, said it was gratifying to think that the work of the Corporation on behalf of the Show had given such satisfaction. No one would be more pleased to hear it than the Borough Surveyor (Mr. R. Wormell), who had put his best foot forward to assist them. Warwick was only a small town, and the Royal Agricultural Show was a big business, not to say a rather alarming undertaking—at least it did seem so at first. But, thanks to the splendid organisation of the Society, their anxious tremors vanished like snowflakes in the sun. The county had been behind the borough all through, and had done Trojan work in helping the Corporation to welcome the Royal Agricultural Society. She would like to say, on behalf of the town and the Warwick estates, how very easy and pleasant it had been to work with the officials and the staff of the Society, and they were happy in having them in their midst. On her own behalf she wished to say how much she admired an organisation that could come to a strange town, bringing with it hundreds of strange people, who had stayed for months and had never given trouble to anyone. In this case she spoke as chief magistrate. (Laughter.) She felt sure that she had the police behind her in making that remark. To the officials of the Society, the staff and workpeople she extended her hearty congratulations.

It was a great honour to the town and to the Castle Park to have the Show there, and the visit would leave behind it many happy memories. Warwickshire thanked the Royal Agricultural Society for having accepted their invitation. (Applause.)

Local Committee Thanked.

Mr. ROLAND BURKE said he had the very greatest pleasure in proposing "That the best thanks of the Society are due, and are hereby tendered, to the Warwick Local Committee for their exertions to promote the success of the Show." On this occasion the Society were fortunate in having had a most excellent local committee, who had provided them with what was surely the most beautiful showground in England, and had carried out most efficiently all the necessary services. In Colonel Wheatley the Committee had had a most excellent Chairman, and he would like to convey their thanks to Mr. Alexander Parker and Mr. Godfrey Payton for all that they had done in connection with the work of the local committee. He was sure that the meeting would wish him to include the name of one who had been a tower of strength to them ever since the Society started work at Warwick; that was Captain Harvey, who had never spared himself. He would also like to mention, as Lady Warwick had done, the name of Mr. Wormell, the Borough Engineer, who had had great difficulties to contend with, and all through had worked like a Trojan. He would like personally to thank all those who had shown him unvarying kindness ever since he took on the work, which had made his task an easy one.

Mr. WILLIAM HARRISON had much pleasure in seconding the resolution proposed by the Honorary Director. He desired to associate himself with the remarks which Mr. Burke had made with regard to the respective members of the local committee.

The motion was unanimously adopted.

Lt.-Col. C. J. H. WHEATLEY, in reply, thanked the meeting for the vote of thanks to the Local Committee and for the kind things said about

them. It must, however, be remembered, he said, that their task was made easy by the courtesy and the hard work of the Honorary Director and the Society's officials. However small the details, nothing seemed too much trouble. The county had supported their efforts very well, and they had managed to raise the necessary funds. This had been largely due to the support accorded by the hunting folk in Warwickshire, the breweries and the banks. Without the hunting men they could not have got together the amount required.

Thanks to Railways.

Mr. JOHN EVENS moved that the best thanks of the Society be tendered to the railway companies for the facilities afforded by them in connection with the Show. He spoke rather with bated breath, because he, in common with several other gentlemen present, had in the past sometimes heard the railways criticised. But to-day he asked them to look at that vast showyard and to think of the valuable collection of stock, produce and implements which the railway companies had carried promptly and safely to Warwick. When they did that, they would realise and understand the amount of work and organisation that fell on the companies, and would pass this resolution with appreciation.

Mr. ALFRED MANSELL, in seconding the vote of thanks to the companies, said he thought they all recognised that such a show as that could not be a success without the co-operation of the railways.

The resolution was unanimously carried.

Member's Suggestions.

No Governor or Member rose in response to the President's enquiry as to whether any Governor or Member had any remark to make or suggestion to offer for the consideration of the Council.

Thanks to President.

Mr. HUBERT J. GREENWOOD said that before the meeting separated he would like to propose that they accord to Sir Arthur Hazlerigg their very best thanks for his services in the chair that day. (Hear, hear.) Sir Arthur's speech at the beginning of the meeting was delivered in such a charming and delightful manner, and was so full of interest that he was sure they all wished that it might have been longer. They could only hope that the result of the Show would be a feather in his cap, and they wished him all success in his year of office.

Mr. SYDNEY MAGER said it was with very great pleasure he seconded the vote of thanks to their President. No words were needed from him, as the motion was one which would merit the approbation of everyone present.

The resolution was put to the meeting by Mr. GREENWOOD, and carried by acclamation.

Sir ARTHUR HAZLERIGG thanked the meeting very much indeed for their vote of thanks. It had been a real pleasure, he said, to help in any way he could. With the assistance of Mr. Turner and others and when one had such a Council as the "Royal" had got and such Stewards, and with such willing co-operation on the part of all concerned, it was not difficult to make the Show a success.

WEDNESDAY, JULY 29, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The following were elected as Governors: Kenneth J. Muirson, Argentine Club, 1 Hamilton Place, London, W.1; Maj.-Gen. the Right Hon. J. E. B. Seely, C.B., C.M.G., D.S.O., Mottistone Manor, Isle of Wight; and 111 new members were admitted into the Society, and five were re-elected.

Mr. ADEANE, in moving the adoption of the Report of the FINANCE Committee, said there was only one point that he felt he ought to bring before the Council, and that was with regard to the report of the Architect. He was sorry to say that the original estimate for repairs and additions to 16 Bedford Square, had been exceeded. The original estimate was £1,261. The actual cost worked out at £1,483, an increase of £222. The details connected with the increase were submitted to the Finance Committee yesterday, and that Committee thought they were unavoidable and therefore reasonable. He would point out that the landlord had allowed the Society 3½ per cent. on the capital outlay, which amounted to £950, and the rent would, therefore, be reduced from £415 to £382.

It was resolved, on the motion of Mr. ADEANE, "That, in order to facilitate the winding up of the accounts of the Warwick Show as early as possible, authority be given for the issue during the recess of orders on the Society's bankers for the payment of accounts connected with the Show."

In moving the adoption of the Report of the CHEMICAL Committee, Mr. FRED SMITH thought the Council would appreciate the kind and sympathetic manner in which the Ministry of Agriculture had received the Council's communication in reference to a published statement on castor-oil seed cake. That statement was likely to be misconstrued, and the Ministry had done everything they could to rectify any erroneous conclusion in regard to the statement. The Ministry had also thanked the Chemical Committee for drawing their attention to the matter.

The Report of the VETERINARY Committee was presented, including the Report of the Special Committee formed to consider the scheme of The National Veterinary Medical Association for the Eradication of Bovine Tuberculosis. Sir MERRIK BURRELL, in moving the adoption of the Report, said that if any member of the Council wished to ask questions about the report of the special sub-committee on the scheme for the eradication of bovine tuberculosis he would be glad to answer them.

No questions were asked, and the Report was adopted.

In presenting the Report of the IMPLEMENT Committee, Lieut.-Colonel STANFORTH said the Council would notice that it raised a question, which had been raised for some little time, as to whether the present arrangement of implements in the Showyard was the best that could be organised. The Committee had gone into the matter both as regards implements and the staging of the silver medal entries. It was naturally the Committee's wish to do the very best that could be done. The Committee rather hoped it would be possible for the Secretary to attend the Show in Paris in January to see what Mr. Borlase Matthews said was a better arrangement in shows than there was in England. The whole question was under consideration, and if it could be arranged for the Secretary to be given leave to attend the Paris Show he thought it would help, possibly, in the making of any alterations that might be considered necessary.

The Report of the SELECTION AND GENERAL PURPOSES Committee having been presented, the PRESIDENT said he thought the Council would like to know that he had sent a letter thanking Sir Charles Howell Thomas, on behalf of the Council, for his nice letter to them, recorded in the Committee's Report. He was sure that members would all think the remarks of the Ministry were very well deserved, and that the Honorary Director and all the officials under him had done very well in getting those animals moved out of the yard so quickly. He was glad that the Ministry were satisfied. (Applause.)

Sir DOUGLAS NEWTON wished to report very briefly upon some of the points of interest arising out of the visit he and others paid to the Agricultural Show at Hanover, in Germany. This was the first opportunity he had had of doing so. The first feature he would like to draw attention to was the decoration of the town itself. The town was particularly

well beflagged. Every tramcar carried a miniature flag, which created rather an air of a fête, and indicated that something out of the way was going on.

With regard to the catalogues of the Show, he would again draw attention to what he regarded as a better manner of dealing with the catalogue than that adopted by the Society. The Royal Show Catalogue weighed 1 lb. 9 oz. It was a very serious tax to handicap oneself on a hot day with 1 lb. 9 oz. of catalogue when probably it gave only about 6 oz. of information that one required. The authorities of the German Show got over the question of weight by putting on sale, first of all, a very convenient bag. [*Here Sir Douglas exhibited a specimen of the bag, the cord of which he slipped over his shoulder.*] It might not be very decorative, but it was very helpful. Further, the German show catalogue was divided into five different sections, and one need not carry the sections one did not want.

Then it was exceedingly difficult to find one's way about the Royal Show Catalogue. For instance, there were two pages of almost every number. If one looked for page 146 one found page 146, and if one looked again he would find another page 146. That was not a very desirable way of compiling a catalogue. He thought that the Royal Show Catalogue might with great advantage be divided into an implement section and a section dealing with the other exhibits.

In regard to guides, a good many people came to the Royal Show and wanted Guides. He found that considerable use was made at the show in Hanover of students who were taking an agricultural course. He was guided round on two occasions by the same student, and found it most helpful. The student took him direct to the most interesting exhibits, and features which otherwise might have escaped his notice were brought to his attention.

There was nothing, he might say, which could in any way compete with the incomparable flower show which was to be found at the Royal Show, but there were three large vegetable tents at the German show, in which there were a considerable number of trade exhibits and in which packing was shown. There was some perfectly marvellous asparagus, and there were beds of lettuce and cucumber in frames. It was a very attractive exhibit.

Then in the stock section there was a Friesland bull called "Christian," which weighed 2,700 lb. and whose progeny had given an enormous yield of milk. There was also a tent devoted to fishing and fish exhibits. It contained seventy-eight large tanks filled with various fish. It was an attractive exhibit, and, he thought, paid for itself by drawing a good many people to see exhibits of that character.

The pens for the pigs were so arranged that the animals could not fight or bite each other, and could be easily judged and handled.

Another feature of considerable interest was a magnificent structure for exhibiting dairy produce. It was built on the principle of a huge hangar with a canvas roof. It certainly made a splendid stage for the various cheese and other dairy produce which was shown, and it was bigger than anything the Royal had had on its showground. That was a wandering show, and, seeing that it could be moved from year to year, it might perhaps be considered whether it would not be worth while building a really big hall on those lines for the Royal Show.

A great feature was also made of the selling of milk. A tent set up for the purpose was full the whole of the time. There was cold milk, hot milk, milk flavoured with chocolate, and milk flavoured with lemon. Everybody had his bottle of milk, and appeared to drink the milk with a straw, and apparently got a good deal of satisfaction in doing so.

In connection with the show itself, numerous trips were organised just after the show to places of agricultural interest. It was not done,

perhaps, by the Committee of the Show itself, but in connection with it and with its approval by various travelling organisations. The new implements were shown in a special tent, and he was still of opinion, in spite of the letters about which they had heard that morning, that there was a good deal to be said for gathering together the new implements under one roof, as far as might be practicable. He saw no great reason why that should not be practicable. It was a great convenience, and it tended to show people what a very large number of new implements were being developed all the time. If people had to hunt those implements out on the different stands they did not realise what a lot of talent was being devoted to their production.

In conclusion, he wondered whether the Council could see its way to appointing one or two of its officers to visit the Show in Germany next year. He took it that it was the biggest agricultural show in the world, at any rate in the whole of Europe, and was attended by the largest number of people. Although, perhaps, that Show had not a great deal to teach English agriculturists, it was the centre of a very enterprising agricultural community, and he thought it was worth while to keep an eye on the various developments they had to show.

The PRESIDENT thanked Sir Douglas Newton for his remarks. He was sure the appropriate Committees would discuss what he had said on the various subjects. He would like also to congratulate Sir Douglas on having the courage to appear more like a hiker than one expected him to look. (Laughter.)

Mr. BORLASE MATTHEWS supported the remarks made by Sir Douglas Newton. Visiting this particular show independently, he was received most courteously by the Association over there, who had taken great trouble in showing him round. He had already conveyed some remarks in writing to certain Committees, who were giving them due consideration. It had certainly been a very interesting visit. He had already mentioned personally to the President that he thought it would be a very good idea if something better could be done for the flower show along the lines of the hangar tent used at Hanover instead of the one the Society had at present. He understood the Society was committed in that there was a contract covering a period of years, but it seemed to him that a little negotiation might induce the contractors to instal a tent of another type during the balance of the time that their contract had to run.

The PRESIDENT asked Mr. Borlase Matthews whether he had written to the Implement Committee about the hangar. Mr. MATTHEWS replied that he had done so.

The PRESIDENT was sure that other members would have gone to the Show at Hanover had they been able to do so. It was unfortunate that it was held at a time when they were very busy with the Show in this country. The Honorary Director was also very busy at that time and found that he could not attend the Hanover Show.

WEDNESDAY, NOVEMBER 4, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

The PRESIDENT: My lords and gentlemen, before resuming the work of the Council after its recess, it is with regret that I have to announce to you the death of Mr. Frank P. Matthews, which occurred a very few days after the Council rose from their July meeting.

Mr. Matthews succeeded Sir Howard Frank as one of the representatives for London in the year 1922, and thus revived the old association of the firm of John Thornton & Co. with this Society, which had been established by the founder of that firm many years ago.

Mr. Matthews was a member of the Veterinary Committee of this Society, and took a keen interest in everything concerning the health of the livestock of this country. He acted as one of the Society's delegates at the Eleventh International Veterinary Congress held in London in August, 1930.

He was often a keen critic of the measures taken to prevent or combat disease in animals, but his attitude was always one of perfect fairness, and he was at all times willing to listen to others holding different opinions.

The Society was represented at the funeral by Mr. Robert Hobbs and the office staff by Mr. Tilly.

Another old stalwart and friend of the Society has passed away in the person of Mr. Thomas L. Aveling, who died at his home at Rochester on October 3rd.

Mr. Aveling was a Governor of the Society and a Member of its Council from 1905 until 1927, and served upon the Finance Committee, the Implement Committee and the Showyard Works Committee.

Most of you here will remember how faithfully he served the Society as one of the Stewards of Finance from 1907 without a break until 1928. He, with the late Mr. Richardson Carr, was entirely responsible for the Finance Office administration in the Showyard.

No hours were too long for him and no duty too great or too small. He rendered invaluable aid to the Society, also, in connection with the implement exhibits and the trials and tests of new and improved agricultural implements, whilst at the same time assisting in the well-being of all that concerned the implement and machinery trade itself.

I think it can be said that for over twenty years he was one of the features of the Royal Show. He was a man of unflinching good temper, with a great understanding of men, and ever willing to lend his advice in anything concerning the affairs of the Society.

I am sure it will be your wish that the sympathy of the Council shall be conveyed to Mrs. Matthews and her two sons, and to the family of the late Mr. Aveling, in the loss they have sustained, and I would ask you to signify this by standing for a moment or two.

The members rose accordingly.

Mr. Rowland Rank, of Old Farm, Aldwick, West Sussex, was elected a Governor, and 14 new Members were admitted into the Society.

In presenting the RESEARCH Committee's Report, which, by consent, was taken next, Sir MERRIK BURRELL thanked the Council for letting it come up early in the proceedings. He had made the request because he desired that the meeting should hear a report from Sir John Russell rather than from himself on the work that had been done. They had been spending £250 a year for the last three years, and had been analysing the work done at Woburn in the last fifty years. Some interesting facts were emerging, and he thought the Council would like to hear about them from Sir John Russell.

Sir JOHN RUSSELL said that he wished to report to the Council the latest data with regard to lucerne cultures. Up to date this season 9,500 cultures had been sold by Messrs. Allen & Hanburys, Ltd., as compared with 7,000 last year. Hitherto 7,000 had been the record; 9,500 cultures sufficed to inoculate about 5,000 acres. The highest previously was 3,500 acres. Since inoculation was introduced, first as the result of Dr. Thornton's experiments, and, secondly, as the result of assistance given by the Research Committee of the Society, the acreage of lucerne had increased by 24 per cent. in England and Wales. The increase had been specially marked in the Midland and Southern Counties, and had amounted to 50 per cent. In those counties inoculation produced some of the best results. In the South-Western Counties the increase had been 40 per cent. There, again, inoculation had been successful. Dr. Thornton was seeking more efficient strains for culture

than he had at present. There were more strains than there were breeds of sheep, and just as the original wild sheep differed from the pedigree animal so probably the first cultures would differ from those that would be got in years to come.

The Council had reason to be proud of the results achieved. If they assessed the value at only 30s. an acre, which was exceedingly low, the net gain to the farmer as the result of research work was more than sufficient to pay the research grant for ten years.

With regard to the work at Woburn, he reported yesterday on two or three items only. First of all, with regard to the effect of lime on light soils. As a result of the examination of the data with regard to the soil at Woburn it had been shown conclusively that the effect of lime did not depend on the quantity that was applied but on the way in which it was applied. With regard to compensation that should be given to a man who had a light soil, a man who gave ten tons in ten small doses of one ton per acre deserved higher compensation than a man who gave three or four larger doses. They had worked out the figures and shown how they should be worked out for other light soils. It had been shown that of the first ton of lime three quarters were good. If two tons were applied, of the second ton only half was good. If three tons were applied only a third was good. The rest was lost, and there should be no compensation for it.

With regard to green manuring, Woburn results had demonstrated quite clearly how it should not be done. They had been able to put their finger on the exact spot and to show what should be done in order to get the best results. Green manuring was a far more difficult matter than had been supposed.

Finally, they had examined the relationship between the effect of fertilisers and weather conditions and had shown the nature of the connection between weather conditions and the effect of different fertilisers in the permanent experiments on Stackyard Field. With regard to farmyard manure they had been able to show where it was superior to artificial and where it was definitely inferior. Further, they had shown the relation between the quality of the produce and the season much more definitely than before. It was possible by the end of May to make a more accurate forecast of the yield and quality of the barley crop.

The experimental work had been going on for fifty years, and had been well done. It would take some time to get all the information resulting from the work, but they believed that it was highly desirable that all the good information gathered during the fifty years' work should be extracted for the use of agriculturists.

The President thanked Sir John Russell for his excellent and interesting exposition of the results at Woburn, which were of great value to the farmers of the country. (Applause.)

Sir MERRICK BURRELL, in moving the adoption of the VETERINARY Committee's Report, outlined the answers to letters in connection with the suggestion of the National Veterinary Medical Association that there should be an attempt to eradicate bovine tuberculosis. Dr. Addison, in a letter, stated that in the opinion of the Ministry of Agriculture any expenditure on attempting to eradicate the disease from small experimental areas was not justified owing to the work already done in the United States, and that it was impossible to face the enormous expenditure that would be entailed in attempting to eradicate the disease from the whole country. The National Farmers' Union agreed that the scheme at the present time was premature.

Dr. Minett was keeping in touch with the Irish officials, who were testing the Spahlinger treatment. It had not gone very far yet. Calves had been bred, but no inoculation had yet taken place.

Mr. JOHN EVENS, in moving the adoption of the report of the JUDGES

SELECTION Committee, said that the Committee suggested the continuance of single judging in all sections of the Show, except in the classes of sheep. Where there had previously been a judge for males and a judge for females it was suggested that the judges should act together instead of separately.

The Report of the SELECTION AND GENERAL PURPOSES Committee having been presented, the PRESIDENT said: Before I put the report to you I should like to take this opportunity of congratulating Lord Mildmay upon his nomination to the Presidency of this Society for the forthcoming year, and I am sure all members of the Council present will join with me in those congratulations. Lord Mildmay will be President when the Royal Show will be held at Southampton. Rumours have reached our ears, and have even been current in the Press, that, owing to the difficult times through which the country is passing, the Society do not propose to go forward with their arrangements for the Show.

I am only too glad to avail myself, in congratulating Lord Mildmay, of the chance to contradict those rumours, and to state for the information of all concerned that the Royal Show will be held as usual. It will be held at Stoneham Park from July 5th to 9th, 1932. Anyone who knows how the Society struggled to continue to hold the shows during two of the years of the War, and were successful, can only come to the conclusion that the rumours, which did attain a limited circulation, were quite unfounded.

In making this statement may I, on behalf of the Council, wish Lord Mildmay a very pleasant year of office and a most successful show at Southampton.

LORD MILDMAI: My lords and gentlemen, you have done me a very high honour indeed in approving the suggestion that I should be President of the Royal Agricultural Society in the coming year. No honour could have greater value, and I thank you most warmly. Let me frankly say that only after very considerable hesitation did I venture to allow my name to go forward as President, because I felt very strongly that my qualifications compared very poorly with those of Sir Arthur Hazlerigg and other predecessors in the office. I know myself that I am very ill-equipped for the office of President. I have not the impressive personality of Sir Arthur, nor can it be said that I have the same standing as an agriculturist as many present who have been in the office; therefore, all the more grateful am I to you for placing me in the office of President, and all the more necessary will it be for me to have, during my year of office, the constant and continuous co-operation and help of every member of the Council and Past Presidents if my year of office is to be a successful one. For that help I feel that I shall not ask in vain, and granted that help I can look forward with confidence to the future. I will do my very best to justify your choice. (Applause.)

Colonel STANFORTH wished to say one word with regard to the Consulting Engineer. Six months ago Mr. S. J. Wright was appointed to act temporarily, and he had fulfilled his duties during that period extremely well. He could only say he had taken a good deal of trouble on behalf of his Committee to go thoroughly into the history of Mr. Wright, his education, his attainments and qualifications for the post. He thought them eminently satisfactory. Mr. Wright was a young man, only thirty-two years of age, and during the period that he had been acting had done extremely well. There were testimonials from those with whom he had been in contact, but he did not propose to trouble the Council with those. It had been his duty to lay them before the Selection Committee, as he had done yesterday. He could assure the Council that he considered that Mr. Wright was most deserving of the position of Consulting Engineer, and he suggested that he should be placed in it. Some of them had had the advantage of knowing Mr. Wright for a considerable

number of years. He had been assistant at the Institute of Agricultural Engineering at Oxford for some time, and he had done practically all the hard work, and there had undoubtedly been a very great deal of work to do at the Institute since its inauguration. The members of the Committee and he had always found Mr. Wright extremely able in administration. To prove what he said, the judges of implements this year in their report had made a special remark with regard to the help they had received, and the very careful report placed in their hands by Mr. Wright with regard to testing *before* the actual show. He was certain that Mr. Wright would fulfil all that was hoped and expected from him, and he had therefore very great pleasure in recommending that he be appointed Consulting Engineer to the Society.

On a motion from the Chair the seal of the Society was ordered to be affixed to—

- (1) The surrender of the existing lease of the Society's house;
- (2) The new lease between the Duke of Bedford and the Society of the same premises; and
- (3) The agreement for the site of the Southampton Showyard.

Sir WALTER GILBEY begged leave to bring before the Council a question of vital importance to the Horse Breeding industry. He appealed to the Council for support and co-operation in connection with the Hunters' Improvement Society, of which this year he was President. He brought the question forward because it was an urgent one as far as his Society was concerned. He thought that members would agree that horse breeding was an enormous asset to the agriculturists of this country, and it was possibly one of the few matters in the last few years that agriculturists or farmers had been able to make any money out of. As all were aware, a grant of £30,000 had been made by the War Office in the past for Thoroughbred Premiums in connection with the Hunters' Improvement Show held every year in March. The position now was that the grant had been entirely withdrawn; and, if he might say so, that had caused very great injustice to those interested in the horse-breeding industry, to breeders of half-bred horses and stallion owners. It was fully recognised, of course, that drastic cuts were essential in every department, but the cut under discussion was the only instance where there had been a total abolition. Those concerned felt it very keenly indeed. They had laid their case before the Treasury, and the Treasury had remitted it to the War Council for further consideration. Therefore, as it was not turned down altogether, they might hope to receive some grant from the War Office. The War Office had agreed to receive a small deputation, which, it was hoped, within the next few days would attend and urge the case. Only £8,000 was asked for to carry on the show successfully this year. The notice of withdrawal was not received until arrangements had been made for the Show and stallion owners had bought their horses for exhibition. He did not think that the Government or the War Office quite realised the position that had been created. Only a minimum amount towards Stallion Premiums was being asked for, and they were hopeful that it would be granted.

He had explained the position to the meeting, and he asked for support. The premiums were first of all given at the Royal Agricultural Show. His Council maintained that it was a matter entirely connected with agriculture and in no sense a political one. Support had been received from many of the County Councils of England, who had written urging the appeal, and also from the National Horse and other societies, who had written justifying the claim for a minimum grant to be made. He would ask that the Council should write a letter to the War Office supporting the claim, which was a very limited one. Such a letter, coming from the Royal Agricultural Society, must necessarily have very great effect. He sincerely hoped that the meeting would see its way

to act by resolution or by letter, because it would affect very materially the horse-breeding interests of the country. There was no question about that. All that they asked was that the grant should be continued to the extent indicated for this year alone in order that they might carry on the Show successfully. That was the reason why they asked that it should be continued. There were some present who, perhaps, did not know in detail the work of the Hunters' Improvement Society. That Society was one of the most successful societies at the present moment in the country. It had been increasing in membership and had done most valuable work. At a critical moment like the present to have such a bombshell thrown at it was most severe. He only asked the Royal Agricultural Society to support by writing a letter shortly before the deputation was received, because he was sure that it would carry very great weight, and he believed that it would clinch the matter with regard to the £8,000.

SIR ARCHIBALD WEIGALL asked for a ruling on a point of order before the matter went further. Quite apart from the present case, was what had been brought up within the sphere and purview of the Society? Certain members of the Council would recollect that some years ago the grant was carried on the vote of the Ministry of Agriculture. The time arrived when the then Minister would not take the responsibility of asking Parliament to continue it as part of the agricultural vote, the ground being that it was not in the interest of agriculture as a whole. It was then transferred to the War Office, who persuaded the House that it was in the interests of light horse breeding for the Army that it should be done, and it had been carried on the War Office vote since. That being so, was it really within the sphere of any agricultural society?

THE PRESIDENT thought it quite within the sphere of the Council to pass such a resolution as it had been asked to pass. He did not think it could be said that any Minister for Agriculture was the last and final judge of what was good for agriculture and what was not. (Hear, hear.) He thought that Sir Archibald Weigall would agree with that. He considered that the question which Sir Walter Gilbey had brought up was perfectly in order. He supposed that the resolution would be:—

"That the Royal Agricultural Society of England support the application of the Light Horse Breeding Association for a grant of £8,000 to carry on the Show next year."

SIR WALTER GILBEY moved accordingly, Lord DARESBURY seconded, and the resolution was adopted.

WEDNESDAY, DECEMBER 9, 1931.

SIR ARTHUR HAZLERIGG, BART. (President), in the Chair.

THE SECRETARY read letters from Mrs. Matthews and Mr. Thomas Aveling acknowledging the messages of condolence and sympathy sent by the Council.

Eight new members were admitted into the Society.

MR. ADEANE moved the adoption of the report of the FINANCE Committee with the exception of the paragraph relating to the Show Accounts, which he would deal with later.

The motion was agreed to.

Dealing with the accounts of the Warwick Show, MR. ADEANE said that as the accounts were given in detail there was no need to trouble the Council with many figures. There was a loss on the Show at Warwick of £3,296, which, considering the times, was less than was expected. It might be of interest to compare some of the Warwick figures with those of Manchester. The receipts at Warwick amounted to £41,058, as compared with £50,807 at Manchester. The principal decreases in receipts

were £2,977 in fees for implements, owing to the small exhibit, and £3,813 in admissions to the showyard. The expenditure was £44,354, against £47,949 at Manchester, and this decrease was mainly accounted for by the saving of £2,329 in the cost of the erection of the showyard. The result was a debit of £3,296, which, he was glad to say, was covered by the £3,500 set aside from the ordinary account each year against losses on the shows.

It would be noticed that the stock fees were down as compared with Manchester by £685, £615 of which was due to the reduction of entry fees for cattle by 10s. a head. On the other hand, by the new system of double-shedding the Society saved £697.

The Show was held under most favourable circumstances, and the Society received a very warm welcome and every support from Warwick and the neighbourhood. The Show occupied one of the most beautiful sites in England, thanks to the kindness of Lady Warwick and the Trustees of the Warwick Estate. Thanks were also due to Lady Warwick, who was Mayor at the time, for her kind hospitality to members of the Council and the Stewards. The Society was very much indebted to the local committee, who raised over £10,000, and really did nobly. In that connection he would like to mention the names of Colonel C. J. H. Wheatley, who was President of the Warwickshire Agricultural Society, the Hon. Alexander Parker, and Captain H. Harvey, who was Secretary of the County Society.

H.R.H. the Prince of Wales again showed his interest in the Society by attending the Show, and his visit undoubtedly added very much to the "gate." To their very able and genial President the Council owed a great deal for piloting them so successfully through this year. (Applause.) They were sorry to part with him.

To the Honorary Director the Council gave great congratulations on having produced one of the best shows that had been held in their time. They also owed a great deal to their indefatigable Secretary, Mr. Turner, especially—and he spoke feelingly—for his economy. They also owed a great deal to the staff.

The PRESIDENT thanked Mr. Adeane for his remarks concerning himself.

In presenting the VETERINARY Committee's Report, Sir MERRIK BURRELL called the attention of the Council to the fact that its crusade against sheep scab which started about two years ago had at last begun to bear really appreciable results. Sheep scab had fallen this year by something like 33 per cent., and he thought they could congratulate themselves upon that. He did not know whether Sir Walter Gilbey would like him to say that it had been made known that morning that as the result of the efforts of themselves and other people the grant to the Light Horse Breeding Society would be continued on a smaller scale.

Sir WALTER GILBEY said that although he had not seen it himself he was glad to inform the Council that his Society had received official notice that a grant of £8,000 for Light Horse breeding would be made to the Hunters' Improvement Society. He felt that a great deal was due to the good offices of the Royal and other important associations in backing this cause. He thanked the Council very much on behalf of the Hunters' Improvement and National Light Horse Breeding Society and himself for backing the resolution sent forward by them.

The PRESIDENT was very glad to hear what Sir Walter had said. The Council would congratulate Sir Walter on sticking to the job until he had got it carried through. He also congratulated the Council on supporting such a good cause.

Mr. BURKE presented the Report of the SHOWYARD WORKS Committee. He would like to say a word about the sad loss sustained by the death of Mr. Godfrey Payton, who as agent for the Warwick Estates, a post

which he held with very marked ability for a great many years, was naturally a very prominent figure not only in the early negotiations when the Society first thought of visiting Warwick, but throughout the whole of the arrangements for the visit of the Society this year. No one could have worked harder. Mr. Payton used every possible endeavour to promote the success of the Show, and all those who were brought into close association with him would, he felt sure, reverence his memory. It would be nice if a letter could go from the President as representing the Council, expressing the deep sympathy of the Council with Mrs. Godfrey Payton and her son and daughter.

The PRESIDENT was sure that the Council would agree with what Mr. Burke had said.

The report was adopted, and it was agreed that the President should send the suggested letter.

The PRESIDENT welcomed on behalf of the Society the two new members of Council who were present: Lieut.-Colonel Wheatley (Warwickshire), whom many of them knew already for his good work at Warwick, and Mr. Glossop (Yorks, West Riding).

Sir MERRIK BURRELL, in moving the adoption of the Report of the RESEARCH Committee, emphasised the fact that the new volume on research was now available for anybody who wished to have it, and the Research Committee very much hoped that members of the Council would talk about it to their friends and urge them to get it and read it in order that the circulation of such a very valuable little book might be enlarged.

He would offer a word of explanation about the request for leave to allot £200 of the Committee's grant for 1932 to the Agricultural Research Council. It was feared, and he thought the fear might be a very real one, that owing to the cutting down of Government grants to various institutions and societies, certain valuable research work which was at present going on would have to be curtailed or entirely stopped. It would not be easy for some of those bodies to pay the present salaries, and if the staffs were cut down or maintenance was curtailed in other ways valuable work which was just coming to fruition might be lost for good. It was suggested by the Sussex Agricultural Society the other day that if at least £400 could be raised that Society would put up a certain sum of money, and would, indeed, give more if more than £400 was raised or the need for more was proved. The Research Committee was asking that the Society should allocate £200 of its research grant to that purpose, leaving the Agricultural Research Council a perfectly free hand to use the money put into the "pool" for whatever purpose it might find necessary as the result of the survey it was making of the research work in the country. If, of course, the minimum sum of £400 was not arrived at, the scheme would fall to the ground and the £200 would not be used.

There was one other small matter he wished to bring to the attention of the Council. He did not know whether he ought to have brought it up under the report of the Veterinary Committee or that of the Research Committee, but it would be remembered that Lord Midmay gave the Council a short while back a most interesting account of the work done in immunising dogs against distemper. A good many people also knew to their cost that the promise of that immunisation was not fully borne out in practice when the dogs or hounds were vaccinated. In the *Veterinary Journal* for the current month there was a short statement showing that Major Dalling, who had been working on this problem at the Wellcome Laboratories, had now arrived at a process by which immunisation had become far more satisfactory. That assertion was made from the fact that in *The Field* experiments carried out under the new system on 1,025 foxhounds Major Dalling had arrived at 99 per cent. efficiency.

He thought that members would be pleased to hear that immunisation was going on in the right direction.

LORD HASTINGS explained that he was a member of the Research Committee, but, owing to the prodigious time taken yesterday by the Forestry Committee, of which he was Chairman, he was not able to be present at the meeting of the Research Committee, and therefore he had to ask at the present meeting the question he would have asked in Committee in respect of the suggested grant of £200. He would ask Sir Merrik Burrell, through the President, whether the Agricultural Research Council, being in the nature of a Government Department or a Department set up by the Government, was entitled or enabled to accept private subscriptions, and what steps were being taken and with whom to raise the sum of £400 from other sources, upon the raising of which the suggested payment of £200 would be conditional. Although Sir Merrik Burrell had done his best to make the situation clear, it seemed to him to be somewhat nebulous, and he would like, therefore, to ask Sir Merrik the specific question as to whether or no the Research Council was enabled to collect funds from private or semi-private sources. Further, he would like Sir Merrik to elaborate the method of collecting the sum of £400 which had to be collected before the sum of £200 which the Royal was to subscribe would be paid.

THE PRESIDENT was very glad that Lord Hastings had asked that question. He himself was unable to be present yesterday, and it struck him, when Sir Merrik was explaining the matter, as a rather dangerous procedure on the part of the Society to offer a sum of money to the Agricultural Research Council. He did not even know that the Agricultural Research Council had asked for any. In these days he did not always give to people who asked, and he never gave to people who did not ask. (Laughter.) Honestly, he thought that more explanation was needed.

SIR MERRIK BURRELL was not sure that he could answer all the questions that Lord Hastings had put. He thought that under the charter granted to the Agricultural Research Council by the Privy Council there was no obstructive clause with regard to their receiving money for the purpose he had outlined, but he would make enquiries. The Agricultural Research Council had a small grant from the Treasury to use in any way it liked. On account of the financial crisis that grant was not as much as had been hoped. There was also a small grant for expenses. He was not sure whether there was anything in the charter which would prevent the Research Council from receiving voluntary money in the way suggested; he would hardly think so, but he would ask the Secretary of the Research Council about it.

This all came forward rather hurriedly, and had not even been before the Agricultural Research Council as a whole. But Sir William Dampier realised that the councils of the agricultural societies which would be approached met mostly in January, and he naturally wanted to send them a circular letter before those councils were held. Sir William asked him yesterday whether he thought he could get the support of the Council of the Royal Agricultural Society, because it would strengthen his letter very materially in approaching the other societies. That was why the matter was pushed forward rather hurriedly. It was felt that the other societies would consider the cause a really good one if it had the Royal at the back of it. Unfortunately, neither Sir William Dampier nor Sir John Russell was able to be present to-day, but they had both asked him yesterday to say that they thought this money could not possibly be expended in a better way if it were forthcoming.

LORD MILDMAI believed that the proceedings of the Agricultural Research Council were more or less framed on the lines of the Medical Research Council. He knew that the Medical Research Council had always been at liberty, not to collect funds, but to accept grants to assist

the work they were doing in the way of research. Very large sums had been contributed in that way.

LORD HASTINGS asked whether it would not be more appropriate that the Agricultural Research Council should be first approached to ascertain whether or not they were prepared to accept voluntary contributions, earmarked, as they probably would be, for a specific purpose? If that Council had not yet been approached, it seemed to him that this might conceivably be treading, if not upon the charter, at least upon the susceptibilities of the Agricultural Research Council. It was necessary, surely, to approach them with the information that certain agricultural societies, including the Royal Agricultural Society itself, would be willing to help them if they would be prepared to accept help. He thought that ought to be a preliminary step.

SIR ARCHIBALD WEIGALL explained that, like Lord Hastings and the President, he was unable to attend the Research Committee meeting yesterday. It seemed to him that, in spite of the urgency of the matter, a little more enquiry might be made about it and a further report presented at the next Council meeting. He did not know whether that would meet Sir Merrik's view.

THE PRESIDENT pointed out that the recommendation in the report was that £200 of the anticipated grant for 1932 should be paid to the Agricultural Research Council for the purposes of the scheme suggested by the Sussex Agricultural Society. That gave the Research Council practically a free hand. The Council did not know how the Sussex Agricultural Society or anybody else wished the money to be disposed of. It was merely for something that the Agricultural Research Council wanted to do.

SIR MERRIK BURRELL agreed, and explained that that was why he had to come to the Council for permission. Had it been a matter of spending £200 from the Research Committee's grant for any specific purpose the Committee would have spent it without coming to the Council for leave. As it was a matter of helping to form a pool of at least £400, and he hoped more, for another body to use for whatever purposes they thought fit—for instance, to carry some research institute over a crisis during the difficult times—in other words, to hand over money, as it was rightly said, to an outside body to spend as they liked and not as the Royal liked—he felt it was right that the Council should have a chance of discussing it and of giving or withholding permission. It was not a thing that the Research Committee could do on its own, and that was why he had raised it to-day.

THE PRESIDENT said it was open to anyone to move that paragraph 10, with which they were dealing at the moment, be referred back, and he would accept that amendment if it was moved.

LORD HASTINGS felt that he owed an apology to Sir Merrik Burrell, the most efficient Chairman of the Research Committee, for not having attended the meeting yesterday and heard then the whole of the arguments ventilated, as no doubt they were. It was entirely owing to the fact that the Forestry Committee, over which he presided, sat for such a prodigious length of time that he was unable to be at the other meeting. Having been unable to attend it, he really felt that the urgency of the matter which Sir Merrik had put forward had not quite been made good. It was conceivable that on reflection this £200 would be considered a most desirable grant. He was not speaking about that at all. He thought that the Agricultural Research Council itself ought to be asked whether they were or were not prepared, as the Medical Research Council were, to accept private grants earmarked for specific purposes. It was on those grounds and those grounds only that he suggested to Sir Merrik that he might possibly accept a motion which he (the speaker) would move to refer that particular paragraph back.

Mr. NEAME thought that the feeling of the Committee yesterday was that there were certain definite lines of research which might be jeopardised if the money was not forthcoming, though it was impossible to say at the moment which particular lines. They were interested in different research bodies, and there were certain lines of research in which they were interested which might be put in jeopardy. The Agricultural Research Council was a body which had its finger on and was in touch with every line of research in the country. If that body had a small sum placed at its disposal out of which it could grant £100, £150 or £200 to a definite line of research, it might be possible to save that definite line of research. As to whether it could accept such a grant, it was understood at the Committee yesterday that the Agricultural Research Council would be only too glad to accept the money and could make very good use of it. That was the impression he carried away. In regard to the matter of urgency, Sir William Dampier wished to send out an appeal to the Societies at the very earliest possible time so that they might make grants at their forthcoming annual meetings.

Mr. REA asked whether it would be possible for the Council to give conditional approval to the grant, the condition being that the queries of Lord Hastings and Sir Archibald Weigall be considered and answered satisfactorily. Otherwise it would mean holding the matter up till the February meeting, and in face of what Sir Merrik Burrell had said that would be a drawback. If the Council gave conditional approval subject to satisfactory answers being given to those questions, that might get over the difficulty.

Mr. BORLASE MATTHEWS, in supporting Mr. Neame, said that he was a member of the Research Committee, and was present at yesterday's meeting; therefore he had the advantage of hearing the comments of Sir William Dampier and Sir John Russell. It seemed to him that the important point was that it would be a pity that research work that had been carried on for long periods, as much as ten years, should be allowed to lapse owing to the economies that the Government had to make at the present moment. In view of the statements which were made by Sir William Dampier, it seemed to him a very appropriate thing to put forward on behalf of this Society to save the work of years which otherwise might be lost. He understood that the Sussex Agricultural Society had already made a grant of some 35 guineas or so conditional upon the amount being raised. It was intended to make application to other societies of that nature. Therefore it would seem that it would be a nice thing and would support the general cause of research on an economic basis if this were put forward on the lines suggested by the Research Committee.

The PRESIDENT understood that Sir Merrik was prepared to accept Mr. Rea's suggestion.

Sir MERRIK BURRELL assented.

The PRESIDENT asked whether Sir Merrik would like the recommendation to read: "The Research Committee recommend that £200 of their anticipated grant for 1932 be paid to the Agricultural Research Council, provided that the Council of the Royal Agricultural Society are satisfied that this is needed and that it is applied to some purpose approved by them," or something of that sort.

Sir MERRIK BURRELL thought the words "approved by them" should not be put in. The Agricultural Research Council must be left a free hand, because they would not only be spending money that the Royal put into the pool, but money put in, he hoped, by other people.

The PRESIDENT asked whether the Council would agree that Sir Merrik Burrell, Mr. Rea and himself should draft the paragraph as amended by Mr. Rea's suggestion after the meeting.

Lord CORNWALLIS understood that if this sum of £200 went from the

Research Committee to the Research Council, there was no extra charge upon the finances of the Society, because it would be part of the grant. That made a difference, but he did not think the whole of the Council quite realised that there was no extra charge upon the finances of the Society. At the same time he confessed he would be rather glad if Sir Merrik could tell them some of the main lines which the Research Council was supporting at the present time, and what was the extent of it. If the Council were told that, he would be more ready to support the proposition.

The PRESIDENT asked whether he could take it that this report was received and adopted subject to such amendment of paragraph 10 as was suggested by Mr. Rea.

Lord HASTINGS asked whether it was expected that he should withdraw his substantive amendment which was before the meeting.

Captain BUXTON thought that Lord Hastings' amendment should be put to the Council. Though present at yesterday's meeting of the Research Committee, he unfortunately had to leave at half-past four, before the question of the £200 grant came up. He felt the great difficulty would be in getting the other money on which the grant was conditional. Sir Merrik's idea was that Sir William Dampier should go round and ask for subscriptions from the agricultural associations. He thought that ninety agricultural associations out of every hundred did not go in for research work at all, but simply for shows. He felt that he would have the greatest difficulty in getting any subscription from the Norfolk Association, and Mr. Smith told him the same yesterday in regard to the Suffolk Association; and if they failed, how would some of the other associations be able to help in finding the £400? As there were so few members of the Research Committee left last evening when this matter was discussed, perhaps four or five, would it not be a good plan for it to be considered at the next meeting?

The PRESIDENT took it that Lord Hastings wanted him to put his amendment.

The amendment was then put to the meeting.

The PRESIDENT announced that the amendment was carried by 19 votes to 13.

The report was then adopted, with paragraph 10 referred back.

The following Standing Committees were appointed for 1932: Finance, Journal and Education, Chemical, Botanical and Zoological (Forestry and Orchards), Veterinary, Stock Prizes, Judges Selection, Implement, Showyard Works, General Show, Selection and General Purposes, Dairy and Produce, Horticultural and Research.

On the recommendation of the Committee of Selection the present members of the various Standing Committees were (with some exceptions) reappointed to those Committees.

Lord Elgin was added to the Journal and Education Committee; Mr. H. Dent Brocklehurst and Mr. J. E. Quesed to the Chemical Committee; Mr. C. W. H. Glossop, M.P., to the Veterinary, Stock Prizes and Judges Selection Committees; Sir William Dampier to the Implement Committee; Sir Harold Mackintosh to the Showyard Works and Dairy and Produce Committees, and Col. C. J. H. Wheatley to the Showyard Works Committee.

Mr. W. Dallimore and Mr. A. D. C. Le Sueur have been co-opted as members of the Botanical and Zoological (Forestry and Orchards) Committee, representing the Royal English Forestry Society.

The PRESIDENT said that as this was the last meeting of the Council at which he would preside, he would like to take the opportunity of thanking all members of the Council, especially all Chairmen of Committees. He would like to thank Lord Daresbury, who had always been at his side, and Mr. Roland Burke. He also thanked the officials of the Society

very much indeed for all their tremendous help to him and all their kindness to him during his year of office. He assured Lord Mildmay that he was a little frightened when he came into the chair for the first time, but when once one got up there it was all right. He would like to thank them all very much indeed.

Proceedings at the Annual General Meeting of Governors and Members,

HELD AT THE ROYAL AGRICULTURAL HALL, ISLINGTON,

WEDNESDAY, DECEMBER 9, 1931.

SIR ARTHUR HAZLERIGG, BART. (PRESIDENT), IN THE CHAIR.

Chairman's Opening Remarks.

The PRESIDENT: I see that the first item on the Agenda is "Chairman's Opening Remarks." This may mean much or it may mean little, but in this case it means a very great deal to me. When you elected me last year as your President, I told you that I considered it a very great honour and also a very great responsibility, and that I relied upon the help of all of you, members of the Council, members of the Society and all the officials, so the first thing I wish to do now is to thank every one of you for the help which you have given me this year. Everyone on the Council and all the officials have my most grateful thanks, and I should like to mention specially Lord Daresbury, Mr. Burke, Colonel Stanyforth and Mr. Adeane among the members of the Council, and Mr. Turner, our Secretary.

I wish also, in connection with the Show at Warwick, to thank once again Lady Warwick, the Warwick Estate Trustees and the Local Committee for their great kindness and help. I should like especially to mention amongst the Local Committee Colonel Wheatley, whom we now welcome as the representative of Warwickshire on the Council—(hear, hear)—Mr. Alexander Parker, an old friend, Captain Harvey, the Local Secretary, and Mr. Wormell, the Borough Surveyor.

I feel I should be doing what you would wish if I just said here now how very sorry I am sure we all were when we read of the sudden death of one who helped us so much at Warwick, namely, Mr. Payton, who was a very good friend to us there.

I wish also once again to record our very great and sincere gratitude to His Royal Highness the Prince of Wales for coming to Warwick and paying a visit to our Show. (Hear, hear, and applause.)

We had an ideal Show ground, a magnificent Local Committee and good weather, and it was through no fault of any of these that we had a loss of about £3,000. It was the combined depression in agriculture and industry which beat us. I think, however, you will all agree with me that it was a very pleasant Show—in fact, one of the pleasantest shows we have ever had. (Hear, hear.) Several innovations were introduced, such as the later hour for the commencement of judging, the penning of the cattle in double shedding, the segregation of cattle from certified and Grade "A" T.T. herds, all of which appeared to give satisfaction to judges, exhibitors and the general public. I cannot say that it gave universal satisfaction; I remember one incident in front of the pavilion when I think one exhibitor was not quite satisfied. Generally speaking, however, satisfaction was expressed, and I should like to offer

our congratulations to our new Honorary Director, Mr. Roland Burke, on his great success in his first year's work for the Show.

I hope that by the time we hold the Show at Southampton brighter times may have come. After all, hope springs eternal, does it not? I hope that Lord Mildmay will have a really successful show at Southampton, both from the standpoint of site and also from the financial point of view. I will leave him to speak for himself; I know he will easily enlist your support. Whilst I feel sad at coming to the end of my year of office, I do most gladly hand over the honour and responsibilities to one like Lord Mildmay, who not only is well known and well liked as a good sportsman and agriculturist in the South, but is also very warmly welcomed on the now none too frequent occasions when he comes up to the Midlands for a hunt. (Hear, hear, and applause.)

Talking of the South and the Show at Southampton brings me to the one point that I wish to make this afternoon with reference to the report, and that is the question of the shortage of members, or, rather, perhaps I should say the question of the increase of our membership. You will see from the report that we are in urgent need of new Governors and new members. If you look at page 4 of the report—I know perfectly well that you have all read it once or twice—(laughter)—you will see that the loss this year is 484. Now, how can that loss be made good? You know how useless circulars are for that sort of thing! The only way you can do anything is by personal effort. If only every one of you here and your friends would bring one extra member in during the year we should have a magnificent increase. I know there is one gentleman, who I believe is here this afternoon, who has made an annual practice for a great many years now of always getting a new member each year and bringing the application form for membership to this meeting. May I say: "Go thou"—or "ye," or whatever the plural is—"and do likewise"? (Laughter.) I am sure that no one will be more gratified if you do this than my successor, Lord Mildmay.

Before I conclude I want you to join in thanking the Smithfield Club and the Royal Agricultural Hall Company for letting us have the use of this room in which we are meeting to-day and for the privilege granted to our members to enable them to attend this meeting. (Hear, hear.) We are all grateful for that, and I know you will wish to thank the Smithfield Club and the Royal Agricultural Hall Company most heartily. (Applause.)

I will not take up more of your time. I will just add that I hope you have read the report, and that those of you who have not read it will do so, and I hope those who have read it have found it satisfactory. I personally have read it two or three times. The details of all the technical and research work carried on by the Society will be found there, as well as the details of that very valuable adjunct, the Quarantine Station, which enables breeders to ship pedigree stock to our Dominions with adequate safeguards against foot-and-mouth disease. All that is fully set out in the report, and I hope that you will all read it and profit by it.

Accounts.

My first duty this afternoon is the presentation of the balance-sheet. You have it in your hands, and also the accounts of the Warwick Show.

Adoption of Report.

Then comes the report of the Council, which has been printed and circulated to each member. May we take that as read? (Agreed.) Then I will ask Mr. Tipper to move its adoption.

Mr. L. C. TIPPER: Sir Arthur Hazlerigg, my Lords, Ladies and Gentlemen, I consider it is a privilege to be permitted to propose the adoption of the report. I have been associated with this Society since my boy-

hood days, not as a member, but as accompanying my father, hand in hand, to the Royal, and later on I joined as a member. I have been to many of your meetings, but I do not know that at any meeting I have had a greater compliment paid to me than I have received now in being asked to move this resolution.

I have rather hurriedly gone through the accounts and the report, and I think that, notwithstanding the adverse position with regard to the balance and a slight diminution in the number of members, the Society is to be heartily congratulated on the wonderful work it is doing. I believe there is no Society in the world of an agricultural character—and I have seen one or two of them abroad—that has done more good work for agriculture continuously than the Royal Agricultural Society of England. I think it is a wonderful tribute to the gentlemen on the Council that, notwithstanding all that has happened in agriculture and all this depression that exists at the present time, we see year after year these smiling faces of people who are working away for the benefit of agriculture. It is particularly a pleasure to us to see such a wonderfully cheerful President looking at us from the chair. (Hear, hear, and laughter.)

With regard to the Royal Show at Warwick, I think you are to be greatly congratulated. I remember the previous Show at Warwick, and I am speaking with some idea of the general feeling at the Show this year when I say that I do not think I heard a single complaint during the whole time I was on the Showground, and I was there fairly continuously, because I had the privilege of escorting those South African farmers who came over here. They expressed great admiration of your Society. I have a long letter here that I received yesterday from Mr. Canham, the Secretary of the British National Union, who organised that tour, and he says he is continually receiving letters from South Africa expressing the appreciation of those gentlemen who came to the Show. (Hear, hear.) As a matter of fact, my experience is that our overseas visitors, whether from South Africa or any other part of the Empire, look upon the Royal Agricultural Society's Show as the Mecca of agricultural interest.

In connection with the Warwick Show you had a new arrangement, which I think was a wonderfully good idea, to receive these overseas visitors. You put there Sir Archibald Weigall, one of the finest men you could get for the job, and I understand from what I have heard that he is going to improve on the arrangement. He was not quite satisfied in his own mind with what happened at Warwick, so he is going to go one better at the next Show to which we bring our visitors over.

Speaking now from another standpoint—I hope I am not wearying this meeting—I think your Society has done a wonderful amount of work with regard to veterinary research. My memory goes back to the days of the first outbreak of cattle plague. You had the co-operation of the late Professor Simmonds and the late Sir George Brown, and men of that stamp, and you have continued the work right away up to the present time, when you are in touch with the Royal Veterinary College and its staff. I do think, in connection with that wonderful work that you have done through the members of your Society—you have got 10,000 of them—that you might do a little bit more possibly than you have done with regard to helping to build up the fund which is necessary for the rebuilding of the Royal Veterinary College in Camden Town. (Hear, hear.) That College to-day is a standing disgrace to this country. There are wonderful veterinary colleges in other parts of the world, and I should like the time to come when we shall be able to say that the Royal Veterinary College in Camden Town, London, or wherever it may be, is the finest in the world. (Hear, hear.)

To-day I appear, Mr. President, not only as an individual, but as the representative of a section of the exhibitors. I think this is the first

time that one representing my section of the exhibitors has spoken at your meetings. I am speaking to-day not only for myself, but on behalf of the Animal Medicine Makers' Association, an Association which has only been in existence for a few years, and they desire me to say how much they appreciate the treatment they receive from you. We do not feel altogether pleased with some of the arrangements; we do not think our stands are quite rightly placed, but that is a matter of chance, and perhaps we may get better treatment in the future. But we have no complaints to make with regard to your officials. They act in a very nice and a very gentlemanly manner to us. I should like to point out that, as far as the industrial section is concerned, collectively, we are the most wonderful people in the world; I find that the Implement Section paid this year £10,308, as against £7,610 paid by the cattle, poultry and miscellaneous exhibitors. The majority of the people who paid that £10,000 are also subscribers, so you see what a wonderful lot of people we are and how we put our hands into our pockets!

I want to say that I do most heartily appreciate what you have done and what your Society has done, and, although you have a slight diminution in your members, I am perfectly certain that if these gentlemen who look so happy and cheerful to-day, and the ladies also, will go out of this room and make up their minds that they will not have another night's sleep until they have each got another new member for you, the membership of the Society will soon be all that you can desire. (Applause.)

The PRESIDENT: I will ask Mr. Hornsby to second the motion.

Mr. R. HORNSBY: Mr. President, my Lords, Ladies and Gentlemen, I have great pleasure in seconding the motion for the adoption of the report, which has been so ably proposed by my old friend Mr. Tipper. Mr. Tipper and I are old stagers, I might say, in connection with the agricultural show. I believe the first that I attended was in 1877, when the Royal Show was at Liverpool, and since that time I have attended practically every year.

I am exceedingly glad that the report is no worse than it is during these adverse times, and we can still look forward to the future with hope, because there has been such progress, as I notice when I look back to the first year when I attended the Royal Agricultural Show. Taking machinery, I believe that in 1877 the first binder was put out; the corn had to be tied by wire; and very great progress has been made in it since then. Only last year I saw further developments, when I was in Australia, and Mr. Tipper and I saw the farmers there reaping the corn and thrashing it at the same time; they were reaping it at the rate of something like 45 acres a day. We have not reached that stage yet in this country.

I will not detain you any longer by making any further remarks, but will only say that I have very great pleasure in seconding the motion for the adoption of the report, which has been so ably proposed by our friend Mr. Tipper. (Applause.)

The PRESIDENT: The motion has been proposed by Mr. Tipper and seconded by Mr. Hornsby, and I will now put it to the meeting.

The resolution was carried unanimously.

Election of President.

The PRESIDENT: The next item on the agenda is the election of the President for the ensuing year, and I will ask Lord Cornwallis to move the resolution.

Lord CORNWALLIS: Sir Arthur, My Lords, Ladies and Gentlemen, I have a very pleasant task to perform in proposing the name of an old friend and brother officer, and, I should like to emphasise, a Kentish man as well as a Devonian, Lord Mildmay of Flete, to succeed you, Sir,

a very difficult task, in the high office of President of this Society for the ensuing year. (Applause.) The Council recommend the name of Lord Mildmay to you, and I am quite sure that you will endorse their recommendation, not only unanimously, but enthusiastically. (Hear, hear.) Ever since he came on to the Council in 1922, Lord Mildmay has thrown himself whole-heartedly into the work of the Council, more especially on the side of veterinary research. He has been a member of the Veterinary Committee, of the Committee of Selection and of the Journal Committee, and he has acted in many other capacities on the Council. We might possibly regret that Lord Mildmay did not come on the Council earlier in his career—(Hear, hear)—but that is easily explained by the fact that he has given the whole of his life to public work, that he has represented his county of Devon so long and so well that he became the Father of the House of Commons—a very rare distinction—and when he went to the repose of the House of Lords he was then able to join our Council. (Laughter.) A brilliant man across country, a noted polo player, a good soldier, a breeder of pedigree cattle, a sympathetic and popular landowner, Lord Mildmay combines all those qualities which commend themselves to the countryside. (Hear, hear.) I know this meeting will agree with me that no name more suitable could be proposed to it for the Presidency in the year when the Show is coming specially to the South of England. (Hear, hear.) No one has worked harder than Lord Mildmay to bring that about, and I therefore have very great pleasure in proposing to you that Lord Mildmay of Flete be our President for the ensuing year. (Hear, hear and applause.)

Lt.-Col. E. W. STANYFORTH: Sir Arthur, my Lords, Ladies and Gentlemen, it is with the greatest pleasure that I rise to second the proposition that has been put before you, not only because I know that it will meet with your entire approbation, but because I do feel—and I think you will feel also—that we are extremely lucky in being able to propose a name such as that of Lord Mildmay. You have heard from Lord Cornwallis the many attributes that Lord Mildmay possesses, but I think in this case it is not a question of telling you all that Lord Mildmay has been and has done, but it is rather for us to congratulate ourselves that there is such a man who will come forward and will occupy the post of President of the Society for us. (Hear, hear.) There is no doubt that in the last few years Lord Mildmay has done everything he possibly could to get the Show down into his own West country, and the Society were very anxious to go down to the West country if it was possible. Lord Mildmay did everything he could to find some site in that district, and the Council, of course, did the same, but, unfortunately, we were unable to find one there. We have a great many members in the West country, and we were anxious to go nearer their own homes and in their own territory, but we were unable to do so, and this has really been the first opportunity we have had of asking Lord Mildmay to be our President, because we are now going into the South of England. I am sure that if we had only been able to find a site in his own West country we should have asked Lord Mildmay to be President earlier than we have done. Lord Cornwallis has said so much about Lord Mildmay, mentioning his political career, that I would only say this, that I think it was commonly known in the House of Commons that there was no more popular Member of the House than Frank Mildmay. (Hear, hear and applause.) That is the noble lord whom we ask you to adopt as your President to-day, and I feel perfectly certain that those of us who are spared to come here again this time next year will be able to say, and rightly say, that there has never been a more popular President than Lord Mildmay of Flete. (Hear, hear and applause.)

The PRESIDENT: It has been proposed and seconded that Lord Mildmay of Flete be elected President of the Society, to hold office until the

next ensuing annual general meeting, and I will now put that resolution to the meeting.

The motion was carried unanimously.

LORD MILDMAI OF FLETE: Sir Arthur, my Lords, Ladies and Gentlemen, I speak with the greatest diffidence, for I know that I cannot give adequate expression to my sense of gratitude to you for the very great honour that you have done me in electing me to the Presidency of the Royal Agricultural Society of England for the prospective year. It has been said before, and said with truth, that the Presidency of this Society is the blue ribbon of the agricultural world, and I am conscious that I have done very little to deserve it.

It has given me the greatest pleasure that this resolution has been proposed by Lord Cornwallis, and seconded by Colonel Stanyforth, both very old friends of mine, as they have said, and both gentlemen who have rendered the very greatest services to the Royal Agricultural Society in the past, and who I hope will be prepared to do so in the future for many a day. (Hear, hear.) They have spoken far too kindly of me, and I have been really touched by what they have said. I hope you will not think that I am vain enough to imagine that all they have said is justified, but I can only say that they have given me very great pleasure. (Hear, hear.)

When I look at the list of Past-Presidents I feel somewhat daunted, for I have to confess that of the science of agriculture I have yet much to learn, but, on the other hand, with regard to my interest in farming and my enthusiastic admiration for the British farmer I give place to no man. (Hear, hear.) I can assure you that my every effort during my year of office will be devoted to serving the interests of agriculture loyally and unceasingly. (Hear, hear.)

I think that my special thanks are due to the members of the Society here assembled in that they have elected me unanimously. I know that I have but ill expressed myself, but, however inadequate my words may be, I hope you will believe that my gratitude is sincere and heartfelt. (Hear, hear.)

British farmers have been having a very bad time of late, but the Royal Show continues to occupy a quite unique position in the eyes of the whole world. (Hear, hear.) It still sets an example to all countries of what breeders of stock of all kinds should aim at, and it is a most remarkable fact that overseas breeders, such as those in South America and South Africa, however great the care they may exercise originally in buying of their best, have to come back to the fountain head, to England, for fresh blood if their stock is not to degenerate. Therefore our Show has a very great importance. It is our shop window. But let it not be forgotten that the Show is not the be-all and end-all of the Society's existence. (Hear, hear.) You will have gathered from the report and from what Sir Arthur has said how important is the work of the Society in many branches of agricultural science. I myself have served for a long time on the Medical Research Council, and I have learned two things. I have learned how interdependent is research work upon human and animal ills—(hear, hear)—and I have also learned how illimitable is the field for research. This Society is constantly exploring that field, and how valuable is the research work, how valuable is the information which it places at the disposal of the members. Will you please make that widely known, so that we may have as large an accession of new members as possible during my year of office? (Hear, hear.) We want them badly, as Sir Arthur has said, and especially do we want them in the South.

There has been an extraordinary rumour prevalent of late that the Show was not to be held at Southampton. The President very promptly contradicted that, and, of course, there was not a word of truth in it.

On the contrary, we welcome the advent of the Show to Southampton, because it will be one of the few occasions when the Society can visit the South. Our Charter lays down that our country meetings—that is the Show—should be held in all parts of England, that in its peregrinations it should cover the whole country, but, unfortunately, owing to unavoidable circumstances, it has not been able to visit the South so much as other parts of England. Colonel Stanforth referred just now to the possibility that the Show might have gone to Devonshire. I have been very anxious for that, and it has been through no fault, as Colonel Stanforth said, of the high officials of the Society that it has not done so. It is only a question of the difficulty of finding a site, and I should like to express the warm thanks of Devonshire men to Lord Daresbury in the past and to Mr. Burke in the present for the infinite trouble they have taken in their search for an adequate site in Devonshire. (Hear, hear.) Unfortunately they were not successful. The Southampton Show, I think, bids fair to be a great success. The arrangements are well advanced and we are receiving important assistance from the locality. I am quite sure that under the able guidance of Mr. Burke, assisted by our most efficient Secretary, we may look forward to a splendid result. (Hear, hear, and applause.) I take this opportunity, as a south-country man, of appealing to all possible exhibitors, in every branch of the Show, as well as to south-country men generally, to accord to the Southampton Show the fullest possible measure of support, so that it may be not only an outstanding success, but such a success as will induce the Council to visit the South more frequently in the future than it has done in the past.

In conclusion, let me say that I shall try hard to follow the shining example of my predecessors in the Presidential Chair. I know that I shall have the greatest difficulty in following Sir Arthur, who has endeared himself to us all not only by his character, but by his efficiency. (Hear, hear.) The times are very difficult, and all is not comfortable at present; things are very uncertain, and I feel that I shall want the constant and continuous help of the Council and of all the members of the Society if I am to fulfil my desire to make my year of office a success and a reply to those critics who are so fond of saying that successful Shows can only be held in the North. (Hear, hear.)

Once more, Gentlemen, I thank you for the very great honour that you have done me in electing me as your President. (Hear, hear, and applause.)

Election of Trustees.

The PRESIDENT: My lords and gentlemen, the next item on the agenda is the Election of Trustees. The names of the present trustees, who are recommended under Bye-law 141 by the Council for re-election, are printed in List A on the Agenda paper, and I will ask you to signify in the usual manner whether it is your wish that those twelve gentlemen be elected Trustees of the Society, to hold office until the next ensuing Annual General Meeting.

The Trustees, whose names are as follows, were duly elected:—

H.R.H. the Prince of Wales, K.G., York House, S.W.1.
 H.R.H. the Duke of York, K.G., 145, Piccadilly, W.1.
 H.R.H. the Duke of Gloucester, K.G., Buckingham Palace, S.W.1.
 Charles Adeane, C.B., Babraham Hall, Cambridge.
 The Duke of Bedford, K.G., Woburn Abbey, Bedfordshire.
 Lord Cornwallis, Linton Park, Maldstone, Kent.
 Percy Crutchley, Sunninghill Lodge, Ascot, Berkshire.
 Lord Daresbury, C.V.O., Walton Hall, Warrington.
 The Duke of Devonshire, K.G., Chatsworth, Bakewell.
 Lord Harlech, C.B., Brogyntyn, Oswestry.
 Sir Arthur Hazlerigg, Bart., Noseley Hall, Leicester.
 Lieut.-Col. E. W. Stanforth, C.B., Kirk Hammerton Hall, York.

Election of Vice-Presidents.

The PRESIDENT: The next item is the election of Vice-Presidents. I will also ask you whether it is your pleasure that the present Vice-Presidents whose names are printed in List B, shall be re-elected, to hold office until the next Annual General Meeting.

The Vice-Presidents were duly elected as below :—

The Rev. C. H. Brocklebank, Westwood Park, West Bergholt, Essex.
Sir Merrik R. Burrell, Bart., Floodgates, West Grinstead, Horsham.
The Earl of Derby, K.G., Knowsley, Prescott, Lancs.
Lord Desborough, K.G., Taplow Court, Bucks.
R. M. Greaves, Wern, Portmadoc, North Wales.
The Earl of Harewood, K.G., Harewood House, Leeds.
William Harrison, Albion Ironworks, Leigh, Lancs.
Lord Mildmay of Flete, Flete, Ermington, S.O., Devon.
The Duke of Portland, K.G., Welbeck Abbey, Worksop.
The Earl of Powis, Powis Castle, Welshpool, Mont.
Viscount Tredegar, C.B.E., Tredegar Park, Newport, Mon.
The Earl of Yarborough, Brocklesby Park, Habrough, Lincolnshire.

Election of Accountants and Auditors.

The PRESIDENT: The next business on the Agenda is the election of our professional Accountants and Auditors for the ensuing year.

Mr. F. L. GOOCH: Mr. Chairman, my lords, ladies and gentlemen, I have very great pleasure in moving that Messrs. Price, Waterhouse & Co. be elected as professional Accountants and Auditors of the Society for the ensuing year.

Mr. KERRIDGE: Mr. Chairman, my lords, ladies and gentlemen, I have great pleasure in seconding that resolution.

The resolution was put to the meeting and carried unanimously.

Election of Ordinary Members of Council.

The PRESIDENT: Under the bye-laws the requisite measures have been taken by the Council to fill the vacancies in group B and in Warwickshire. As Chairman I have to formally report to the Annual General Meeting the names and addresses of the members of the Council who have been elected by the various divisions in order that the meeting may, in the words of the bye-law, take cognisance of their election. I perform this duty by placing before you List C on pages 3 and 4 of the Agenda paper, in which the names of the newly elected members are specially marked.

Durham: William Burkitt, Grange Hill, Bishop Auckland.
Yorks (West Riding) (two representatives): C. W. H. Glossop, M.P., Bramwith Hall, Doncaster; Sir Harold Mackintosh, Conyngham Hall, Knaresborough.
Nottingham: Thomas Forshaw, The Stud, Carlton-on-Trent, Newark.
Leicester: W. Lindsay Everard, M.P., Ratcliffe Hall, Leicester.
Rutland: E. Guy Fenwick, North Luffenham Hall, Stamford.
Suffolk: Fred Smith, Deben Haugh, Woodbridge.
Buckingham: B. J. Gates, Pembury, Tring.
Essex: Sir Walter Glibey, Bart., Elsenham Hall, Elsenham.
London (two representatives): H. Dent Brocklehurst, Burley, Woolton Hill, Newbury; Lieut.-Col. Sir Archibald G. Weigall, K.C.M.G., Englemere House, Ascot.
Shropshire (two representatives): Alfred Mansell, College Hill, Shrewsbury.
E. Craig Tanner, Byton-on-Severn, Wroxeter, Shrewsbury.
Hereford: Sir John R. G. Cotterell, Bart., Garnons, Hereford.
South Wales: Capt. Hugh A. Christy, Llangoed, Llysven, Breconshire.
Devon: Sir J. F. Shelley, Bart., Posbury House, Crediton.
Wiltshire: Earl of Radnor, Longford Castle, Salisbury.
Surrey: R. Borlase Matthews, Great Felcourt, East Grinstead.

Additional Representative Elected under Bye-law 149.

Warwick: Lieut.-Col. C. J. H. Wheatley, Berkswell Hall, Coventry.

The PRESIDENT: Has any Governor or member any remark to make or suggestion to offer that may be referred to the Council for consideration? No remarks or suggestions were made.

Thanks to President.

LORD DARESBURY: My lords, ladies and gentlemen, I have a very pleasant duty to perform, and that is to move a hearty vote of thanks to Sir Arthur Hazlerigg for his conduct in the chair during the past year. (Hear, hear.) We have never had a President who carried the business through in so efficient a manner and with such good humour as Sir Arthur—(hear, hear)—and it makes a great deal of difference. He has had a lot of hard work to do during the year, and he has managed to get on very well with it and always has a smiling face. (Hear, hear.) Mr. Burke, who was to have seconded this resolution, wishes me to say how heartily he thanks Sir Arthur for all he has done to help him. It makes a wonderful difference to an Honorary Director if the President is always ready to help him in all he does. I do not think you could have had a better President than Sir Arthur has been. He went into every detail of the Show and he helped tremendously at Warwick in getting things done. I am sure we all owe him a very great debt of gratitude for his conduct in the Chair and his conduct throughout the whole of the year. (Applause.)

LORD HASTINGS: The pleasant duty of seconding this vote of thanks was to have fallen to Mr. Roland Burke, but he has been called away, and asked me if I would fill the rôle. I am very grateful for the opportunity of doing so. I am grateful because it gives to me, as an ordinary member of the Council, the opportunity of thanking publicly our retiring President for the remarkable way in which he has conducted the business of the Society during his year of office. The members of the Society as a whole know very well how efficiently Sir Arthur has carried out those duties which appear most in the public eye, that is to say, in respect of his actual Presidency on the days of the Show, but only members of the Council can know how well he has conducted the business of the Society day in and day out during his year of office. (Hear, hear.) I can assure members of the Society and Sir Arthur himself that the Council are grateful to him for his wonderful aptitude in the Chair—(hear, hear)—his invariable cheerfulness and geniality to members, his quickness in the uptake, his wit—(hear, hear)—and his decisiveness. Ladies and gentlemen, he does not only fill the chair amply—(laughter)—but he ornaments it. (Hear, hear).

I beg on my own behalf and on behalf of Mr. Roland Burke, for whom I speak, most heartily to second the vote of thanks which has been moved by Lord Daresbury, and I have no doubt that when it is put to the meeting it will be received with the acclamation which it deserves. (Loud applause.)

The resolution was put to the meeting by Lord DARESBURY, and carried with acclamation.

THE PRESIDENT: Lord Daresbury, Lord Hastings, my lords, ladies and gentlemen, it is extraordinarily kind of you to give me this vote of thanks. The nice things which Lord Daresbury has said about me do touch me very much, and so also do the remarks of Lord Hastings. If in any way I have been a success as President or Chairman during the past year, it is because I was brought up to do work as an assistant steward at the Royal by a gentleman whom you used to know as Gilbert Greenall. (Applause.) It is to him that I owe any success I have had, and it is very kind of him to propose this vote of thanks. I might possibly after all this have become a little swollen-headed, but I have got such a very sore throat that it prevents it going to my head. (Laughter.) Therefore I would just say thank you all very much indeed for your great help during my year of office, which I have thoroughly enjoyed.

Royal Agricultural Society of England.

AWARDS OF PRIZES AT WARWICK, 1931.

ABBREVIATIONS.

- I., First Prize. II., Second Prize. III., Third Prize. IV., Fourth Prize. V., Fifth Prize. R.N., Reserve Number. H.C., Highly Commended. C., Commended.

The responsibility for the accuracy of the description or pedigree, and for the eligibility to compete of the animals entered in the following classes, rests solely with the Exhibitors.

Unless otherwise stated, each Prize Animal in the Classes for Horses, Cattle, Goats, Sheep, and Pigs, was "bred by Exhibitor."

HORSES.

Shires.

Class 1.—*Shire Stallions, born in 1928.*

- 1 I. (220.)—J. MORRIS BELCHER, Tibberton Manor, Wellington, Shropshire, for Bryntanat 40479, black, bred by H. C. Pilkington, Bryntanat, Llansantffraid, Mont.; s. Moulton Harboro 39559, d. 95321 Ruby by Bramhope Monogram 31232.
- 2 II. (210.)—THE DUKE OF DEVONSHIRE, K.G., Chatsworth, Bakewell, for Chatsworth First Command 40491, bay; s. Rearsby Commander 39777, d. 118638 Moors Debut by Pendley St. Leger 35952.

Class 2.—*Shire Stallions, born in 1929.*

- 3 I. (220, & Champion.)—G. R. C. FOSTER, Anstey Hall, Trumpington, Cambridge, for Bower Winalot 40672, bay, bred by J. G. Bunciman, 15, Downing Street, Cambridge; s. Lucky Dog 39250, d. 110836 Babingley Sprite by Enderby Marksman 33947.
- 6 II. (210.)—W. J. CUMBER, The Chestnuts, Theale, Berks, for Theale Lionheart 40822, brown, bred by the Co-operative Wholesale Society, Cherhill, Calne, Wilts; s. Theale Richard 40179, d. 117337 Shopmoller May Queen by Relevaulx Friar 36013.
- 7 III. (25.)—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for Boro' Enterprise 3rd 40668, bay, bred by F. W. Griffin, Boro' Fen, Peterborough; s. Brookhill Padre 39852, d. 117865 Boro' Conquest by Rowington Recruit 34145.
- 5 R. N.—J. MORRIS BELCHER, Tibberton Manor, Wellington, Shropshire, for Tibberton Harboro King.
H. C.—9. C.—11.

Class 3.—*Shire Stallions, born in 1930.*

- 14 I. (220, & R. N. for Champion.)—E. BOSTOCK, Gibbett Hill, Coventry, for Old House Briar King, bay, bred by W. Jackson, Shustoke, Coleshill, Birmingham; s. Old House March King 40182, d. 118681 Monks Green Maria by Babingley Nulli Secundus 26993.
- 12 II. (210.)—J. MORRIS BELCHER, Tibberton Manor, Wellington, Shropshire, for Lugg Side Clansman, dark brown, bred by S. Goodwin, Irvington Court, Leominster; s. Ledwyche Clansman 39242, d. 119886 Lugg Side Darkie by Tibberton Blood Royal 35580.

¹ Champion Gold Medal, and 25 to the Reserve, given by the Shire Horse Society for the best Stallion. A Prize of £2 is also given by the Shire Horse Society to the Breeder of the Champion Stallion, provided the Breeder is a Member of the Shire Horse Society, and the Dam of the animal is registered in the Shire Horse Stud Book.

- 16 **III. (#5).**—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for **Imperial Premier**, bay, bred by Gardner Bros., Holker Farm, Rawcliffe, Garstang; s. Bradgate Premier 39651, d. Princess May by Marden Dagnam 34137.
 21 **R. N.**—JAMES MERRITT, Old Hall Stud Farm, Willaston, Wirral, Cheshire, for **Hadlow Warrior**.

Class 4.—Shire Mares, with their own foals at foot.

- 25 **I. (#20).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 118409 **Kerry Glanish Maid**, bay, born in 1923 [foal by Pendley Harvester 40368], bred by Ben Alderson, Glanmehell, Newtown, Mont.; s. Basildon Clansman 36277, d. 108657 **Kerry Blossom** by Halstead Blue Blood 27897.
 29 **II. (#10).**—G. R. C. FOSTER, Anstey Hall, Trumpington, Cambridge, for 123615 **Bower Beatrice**, brown, born in 1926 [foal by Statfold Nulli Secundus 40170], bred by A. Jones, 14, Rattan Road, Eastbourne; s. Cowage Dalesman 39149, d. 110247 **Thames Empress** by Sherenden Champion 36915.
 24 **III. (#5).**—SIR GOMER BERRY, BART., for 123881 **Hay End Dark Lady**, black, born in 1925 [foal by Edingale Blend 40272], bred by H. Watson, High Offley Farm, Stafford; s. Sussex Goalkeeper 34365, d. 78979 **New Park Grey Queen** by Rickford Coming King 27709.
 27 **IV. (#4).**—E. A. BOOTE, Elliotts Farm, Barford, Warwick, for **Elliotts Lady Buscot**, brown, born in 1926 [foal by Brooksby Combination 39853], bred by John D. Davis, Twan, Old Colwyn; s. Herontye Buscot 37494, d. 108525 **Hawton Movement** by Victor of Albion 32892.
 26 **R. N.**—RICHARD BLUCK, Weston Farm, Stratford-on-Avon, for **Westonavon Peaceful**.
H. C.—31.

Class 5.—Shire Colt or Filly Foals, the produce of Mares entered in Class 4.¹

- 36 **I. (#10).**—RICHARD BLUCK, Weston Farm, Stratford-on-Avon, for bay colt, born May 7; s. Ledwyche Vassal 40483, d. 120418 **Westonavon Peaceful** by Ingon Champion 39222.
 41 **II. (#5).**—SIDNEY LEES, Church Farm, Bishops Tachbrook, Leamington, for bay filly, born April 25; s. Old House Nulli Secundus 40133, d. Bishops Tachbrook Briar Rose by Lymn Briar King 39533.
 32 **III. (#3).**—HIS MAJESTY THE KING, Sandringham, Norfolk, for bay filly, born April 28; s. Appleton Wyresdale 40202, d. 104348 **Marden Fuchsia** by Champion's Goalkeeper 30296.
 40 **R. N.**—CHARLES GILMAN, Statfold, Tamworth, for Statfold Harboro.
H. C.—35.

Class 6.—Shire Mares, born in or before 1927, not having a foal at foot. A Mare 6 years old or over must have produced a live foal in 1930 or 1931.¹

- 42 **I. (#15, & R. N. for Champion).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 121192 **Pendley Rose Marie**, brown, born in 1926, bred by F. W. Flintoff, Worminghall, Thame; s. Monks Green Friar 35891, d. 111318 **Cole Duchess** by Barn King Cole 35374.
 45 **II. (#10).**—G. EWART, Dunsmore Stud Farm, Clifton, Rugby, for 121871 **Dunsmore Victory**, black, born in 1926; s. Woolscott King Cole 39073, d. 121867 **Dunsmore Alpha** by Marden Blend 36734.
 49 **III. (#5).**—MISS G. H. WEBB-PEPLOE, Folly Farm, Ilmington, Stratford-on-Avon, for 121259 **Remembrance of Arden**, bay, born in 1926; s. Carlton Wyresdale 39130, d. 114082 **Dogdyke Bonny** by Maryshall Majestic 36747.
 47 **R. N.**—MATTHEW T. HARRISON, Wedgcock Park, Warwick, for **Breck Sunflower**.

Class 7.—Shire Fillies, born in 1928.

- 51 **I. (#20).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 123456 **Tysce Gem**, brown, bred by T. E. Wells, Tysce, Kineton, Warwick; s. Warton Reciprocity 37020, d. 115652 **Tysce Gloaming** by Ratcliffe King Cole 36846.
 52 **II. (#10).**—W. J. CUMBER, The Chestnuts, Theale, Berks, for 123501 **Wick Locket**, bay, bred by Fred Doble, Winterbourne Bassett, Swindon; s. Theale Locksmith 37900, d. 110642 **Wick Princess** by Crossmoor Prince Forester 35858.
 53 **III. (#5).**—DYNAM ESTATES COMPANY, Llandinam Hall Farms, Llandinam, Mont., for 123323 **Rand Forest Princess**, bay, bred by Ernest Sherwin, Rand Grange, Bedale; s. Woodfold Harold of the Forest 32934, d. 101033 **Ancliffe Dray Lass** by Warton Dray King 30002.
 54 **R. N.**—G. EWART, Dunsmore Stud Farm, Clifton, Rugby, for **Dunsmore Special Blend**.

Class 8.—Shire Fillies, born in 1929.

- 57 **I. (#20, & Champion).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 124090 **Pendley Marceline**, bay, bred by W. Newhouse, Ancliffe Hall, Slyne, Lancs; s. Darley Wild Wave 38149, d. 106673 **Ancliffe Winnie** by Warrior Carlton 31943.

¹ Prizes given by the Shire Horse Society.

² Champion Gold Medal, and £5 to the Reserve, given by the Shire Horse Society for the best Mare or Filly. A Prize of £2 is also given by the Shire Horse Society to the Breeder of the Champion Mare or Filly, provided the Breeder is a Member of the Shire Horse Society, and the Dam of the animal is registered in the Shire Horse Stud Book.

- 62 II. (410.)—E. W. WEBB, Wickham Lodge, Cooden Drive, Bexhill-on-Sea, for 123583 *Bierton Champion's Duchess*, bay, bred by T. J. Roads, Broughton, Aylesbury; s. Hedges Champion's Surprise 39509, d. 120549 *Bierton Hill Duchess* by Hill Manor Champion 39728.
- 56 III. (85.)—J. H. BENTON, Englefield House, Reading, for 124036 *Mile House Clanish Lass*, bay; s. Clippenham Recorder 39866, d. 120328 *Theale Clanish Lady* by Basildon Clansman 36277.
- 59 R. N.—G. R. C. FOSTER, Anstey Hall, Trumpington, Cambridge, for Bower Leading Lady. H. C.—60.

Class 9.—*Shire Fillies, born in 1930.*

- 72 I. (220.)—A. THOMAS LOYD, Lockinge House, Wantage, Berks, for Lockinge Amazon, bay; s. Heirloom 3rd 39510, d. 103900 *Kelmscott Waac* by Monks Green Clansman 34170.
- 70 II. (210.)—G. R. C. FOSTER, Anstey Hall, Trumpington, Cambridge, for Bower Misty Morn, dark bay, bred by J. G. Runciman, 15, Downing Street, Cambridge; s. Medmenham Dictator 40118, d. 110836 *Babingley Sprite* by Enderby Marksman 33947.
- 73 III. (25.)—COL. A. F. NICHOLSON, Stockwell House, Leek, for Leek Wendy, bay; s. Theale Tilton 40423, d. 119856 *Leek Mystery* by Coldharbour Blue Blood 36435.
- 74 IV. (24.)—E. W. WEBB, Wickham Lodge, Cooden Drive, Bexhill-on-Sea, for Lady Bulwark, bay, bred by Tom Hanson, New Lodge Farm, Penistone; s. Burcot Bulwark 40223, d. 109117 *Moulton Abbess* by Moulton Abbott 35902.
- 69 V. (23.)—DINAM ESTATES COMPANY, Llandinam Hall Farms, Llandinam, Mont., for Hafren Bountiful, brown, bred by Ernest Sherwin, Rand Grange, Bedale; s. Clippenham Friar 38110, d. 101033 *Ancliffe Dray Lass* by Warton Dray King 30002.
- 64 R. N.—HIS MAJESTY THE KING, Sandringham, for Lockinge Abbess. H. C.—65, 71.

Class 10.—*Shire Geldings, by registered sires, born in or before 1928.*¹

- 81 I. (220.)—E. W. WEBB, Wickham Lodge, Cooden Drive, Bexhill-on-Sea, for Snowswick Captain, brown, born in 1927, bred by David Maudrell, Buscot, Lechlade; s. Heirloom 3rd 39510, d. 118948 *Snowswick Blackbird* by Rievaulx Friar 36013.
- 79 II. (215.)—MANN, CROSSMAN & PAULIN, LTD., Albion Brewery, Whitechapel Road, London, E.1, for Highfield, bay, born in 1926, bred by J. B. Hall, Stillingfleet Hill Farm, Eserick, York; s. Ruler's Monk 38489.
- 78 III. (210.)—SIR WALTER GILBEY, BART., The Lodge, Elsenham, Essex, for Clansman, bay, born in 1928, bred by Allan Holm, The Grange, Tilton, Leicester; s. Basildon Clansman 36277, d. 113152 *Tilton Maid of Honour* by Babingley Nulli Secundus 26993.
- 80 IV. (25.)—MANN, CROSSMAN & PAULIN, LTD., for Lincoln, bay, born in 1926, bred by Jones & Sons, Great Weston, Mont.; s. Lincoln What's Wanted 2nd 35812, d. Briton by Milestone Briton.
- 76 V. (25.)—PETER DAVIES, Gorsefield, West Timperley, Cheshire, for Midlands Prince, bay, born in 1926, bred by J. Jones, Rhydagioles, Forden, Mont.; s. Camlad Conjuror 39434.
- 75 R. N.—C. J. BAYES, Hunsote, Wellesbourne, Warwick, for Norman.

Clydesdales.

Class 11.—*Clydesdale Stallions, born in 1929.*

- 85 I. (220, & Champion.)—T. & M. TEMPLETON, Sandyknowe, Kelso, for Benedictine 21836, bay, bred by John P. Meikle, Pilmuir, Lander; s. Benefactor 20867, d. Ailsa 54770 by Apukwa 14567.

Class 12.—*Clydesdale Stallions, born in 1930.*

- 95 I. (220, & R. N. for Champion.)—T. & M. TEMPLETON, Sandyknowe, Kelso, for The Factor, black, bred by John Baxter & Sons, Templehall, Ormiston; s. Benefactor 20867, d. Templehall Sunray 57470 by Sunbeam 19566.
- 88 II. (210.)—CRAWFORD & SCOTT, Birkhall, Holywood, Dumfries, for Birkhall Norseman, dark brown, bred by David Shearer, Midhouse, Holm, Orkney; s. Petty Emblem 21233, d. Nelly Majestic 58713 by Craigie Majestic 19978.

Class 13.—*Clydesdale Mares, born in or before 1928.*

- 99 I. (220, & Champion.)—ROBERT PARK, Brunstane, Portobello, for Brunstane Phyllis, bay, born in 1925, bred by R. M. Leslie, Murroes, Arbroath; s. Brunstane Again 20717, d. Eva of Murroes 54066 by Ardendale 18993.
- 96 II. (210.)—G. M. BECK, The Lane, Ravenstonedale, Westmorland, for Lane Mayflower, black, born in 1927, bred by the late James Gray, Glencolah, Kippen; s. Benefactor, 20867, d. Rue Mayflower 55956 by Dunure Footprint 15203.

¹ Prizes given by the Shire Horse Society.

² Champion Silver Medal given by the Clydesdale Horse Society for the best Stallion.

³ Champion Silver Medal given by the Clydesdale Horse Society for the best Mare or Filly.

lxxii *Awards of Live Stock Prizes at Warwick, 1931.*

- 100 **III. (#5).**—**ROBERT PARK, for Brunstane Ruby**, brown, born in 1928, bred by James Gray, Westnewhall, Kingsbarns, Fife; *s.* Brunstane Again 20717, *d.* Crawfordston Ruby 57096 *by* Botha 19026.

Class 14.—Clydesdale Fillies, born in 1929.

- 102 **I. (#20, & R. N. for Champion.¹)**—**G. M. BECK, The Lane, Ravenstonedale, Westmorland, for Lane Lucky Girl**, brown; *s.* Benefactor 20867, *d.* Craigie Beauty 56012 *by* Dunure Footprint 15203.
 105 **II. (#10).**—**T. & M. TEMPLETON, Sandyknowe, Kelso, for Rosemary**, black; *s.* Benefactor 20867, *d.* Rosabell 56233 *by* Kinleith Footprint 19592.
 103 **III. (#5).**—**JAMES LITTLE, High House Farm, Bebside, Northumberland, for Favourite**, chestnut, bred by Mrs. Cass & Son, Seaville, Silloth, Cumberland; *s.* Dockray Designer 19990, *d.* Seaville Nora 57953 *by* Dunure Fashion Hint 18705.
 101 **R. N.**—**DAVID ADAMS, Auchencraig, Dumbarton, for Pamela**.

Class 15.—Clydesdale Geldings, by registered sires, born in or before 1928.²

- 110 **I. (#20).**—**WILLIAM YOUNG, West Preston, Preston Mill, Dumfries, for Preston Mark**, bay, born in 1927, bred by Donald McIntosh, Kintyre, Kirmuir; *s.* Rising Sun 20429.
 108 **II. (#10).**—**JAMES KILPATRICK, Craigie Mains, Kilmarnock, for Duncan**, bay, born in 1926, bred by the District Board of Control, Inverness; *s.* Craigie Sundial 20725.
 109 **III. (#5).**—**GEORGE SCOTT, Birkhall, Holywood, Dumfries, for Farmer**, bay, born in 1928, bred by John Cameron, Kirkton, Forglie, Turriff; *s.* The Dunlop 20881, *d.* Kirkton Queen 55859 *by* Prince Ossian 16004.
 106 **R. N.**—**ARCHIE BOADLE, West End Farm, Flimby, Maryport, for Davie**.

Suffolks.

Class 16.—Suffolk Stallions, born in or before 1927.³

- 115 **I. (#20, & Champion.⁴)**—**MRS. EVELYN RICH, Wretham Hall, Thetford, for Morston Gold King** 5643, born in 1924, bred by A. T. Pratt, Morston Hall, Trimley, Ipswich; *s.* Morston Gold Guard 4234, *d.* Leda's Queen 7772 *by* Bawdsey Harvester 3076.
 114 **II. (#10).**—**ARTHUR T. PRATT, Morston Hall, Trimley, Ipswich, for Darsham Duke** 5878, born in 1926, bred by Capt. R. J. Catchpole, Darsham, Suffolk; *s.* Berden Bacchus 5382, *d.* Darsham Duchess 8906 *by* Darsham Sheik 4139.
 120 **III. (#5).**—**R. EATON WHITE, Boulge Hall, Woodbridge, for Boulge Sailor** 5914, born in 1927; *s.* Admiral of Boulge 5738, *d.* Boulge Queen Mary 9985 *by* Sudbourne Bellman 4153.
 111 **R. N.**—**P. A. BAYMAN, Letheringham Abbey, Woodbridge, for Wanstead Wedgewood**.
H. G.—118.

Class 17.—Suffolk Stallions, born in 1928.

- 121 **I. (#20, & R. N. for Champion.⁴)**—**NORMAN EVERETT, Rushmere, Ipswich, for Rushmere Ringleader** 6040; *s.* Tattingstone Beau Esprit 4927, *d.* Rushmere Ringlet 12128 *by* Earl Gray 4219.
 124 **II. (#10).**—**SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for Bawdsey Prophet** 6030; *s.* Worlingham Red Gold 5506, *d.* Bawdsey Prophetess 12602 *by* Bawdsey Hay 4188.

Class 18.—Suffolk Stallions, born in 1929.

- 125 **I. (#20).**—**E. S. BUCK & SON, Sycamore Farm, Raveningham, Norwich, for Beatty of Raveningham** 6121, bred by J. G. Orton, Chattisham, Ipswich; *s.* Furnham Beatty 4942, *d.* Chattisham Mary 12655 *by* Woolverstone Checkmate 4683.
 129 **II. (#10).**—**W. G. HARVEY, Kentish Farm, Stisted, Braintree, for Culverden Triple Cups** 6099, bred by R. Carley, Badingham Red House, Woodbridge; *s.* Bawdsey Bountiful 5551, *d.* Culverden Comet 13276 *by* Worlingworth Mascot 4318.
 126 **III. (#5).**—**THE EARL OF FEVERSHAM, Duncombe Park, Helmsley, York, for Riddlesworth Bend Or** 6107, bred by W. N. L. Champion, Riddlesworth Hall, Thetford; *s.* Shotley Counterpoint 5609, *d.* Riddlesworth Barmald 12480 *by* Sudbourne Beau Brocade 4235.
 131 **R. N.**—**MRS. EVELYN RICH, Wretham Hall, Thetford, for Lidgate Red Gold**.
H. G.—127.

Class 19.—Suffolk Stallions, born in 1930.

- 136 **I. (#20).**—**FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill, for Wratting Primate** 6132; *s.* Worlingham Red Gold 5506, *d.* Wychnor Primrose 13102 *by* Bawdsey Wassall 5132.

¹ Champion Silver Medal given by the Clydesdale Horse Society for the best Mare or Filly.

² Prizes given by the Clydesdale Horse Society.

³ Prizes given by the Suffolk Horse Society.

⁴ The "Coronation" Perpetual Silver Challenge Cup given by the Suffolk Horse Society for the best Stallion.

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- 134 **II. (£10).**—NORMAN EVERETT, Rushmere, Ipswich, for *Rushmere Hallmark* 6165; *s.* Tattingstone Beau Esprit 4927, *d.* Rushmere Beryl 10912 by Morston Gold Guard 4234.
 132 **III. (£5).**—W. N. L. CHAMPION, Riddlesworth Hall, Thetford, for *Riddlesworth Red Admiral* 6181; *s.* Admiral of Riddlesworth 5966, *d.* Riddlesworth Petal 11280 by Sudbourne Petard 4471.
 137 **R. N.**—OWEN H. SMITH, Langham, Oakham, for *Ranksborough Salute*.

Class 20.—Suffolk Mares, with their own foals at foot.

- 140 **I. (£20, & Champion.¹)**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for *Bawdsey Seedling* 14806, born in 1927 [foal by Sir Harry of Morston 5676]; *s.* Worlingham Red Gold 5506, *d.* Bawdsey Hayseed 9496 by Bawdsey Hay 4188.
 144 **II. (£10).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for *Thorpe Countess* 13635, born in 1925 [foal by Worlingham Red Gold 5506], bred by H. W. Daking, White Hall, Thorpe-le-Soken; *s.* Tattingstone Beau Esprit 4927, *d.* White Hall Countess 9942 by Morston Gold Guard 4234.
 142 **III. (£5).**—FRANK SAINSBURY, for *Framlingham Juno* 13717, born in 1925 [foal by Worlingham Red Gold 5506], bred by W. Woodgate, Framlingham, Suffolk; *s.* Blackmore Hopeful 5206, *d.* Framlingham Janie 9875 by Framlingham Joffres 4425.
 143 **R. N.**—FRANK SAINSBURY, for *Nortonian Dinah*.
H. C.—139. **C.**—145.

Class 21.—Suffolk Colt Foals, the produce of Mares in Class 20.²

- 148 **I. (£10).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for foal, born March 15; *s.* Worlingham Red Gold 5506, *d.* Nortonian Dinah 11828 by Horstead Vanguard 4784.
 147 **II. (£5).**—THE EARL OF IVREAGH, C.B., C.M.G., Pyrford Court, Woking, for foal, born February 22; *s.* Worlingham Red Gold 5506, *d.* Pyrford Phillida 14599 by Cressing Crusader 5433.

Class 22.—Suffolk Filly Foals, the produce of Mares in Class 20.²

- 149 **I. (£10).**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for foal, born January 8; *s.* Sir Harry of Morston 5676, *d.* Bawdsey Seedling 14806 by Worlingham Red Gold 5506.
 151 **II. (£5).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for foal, born January 10; *s.* Worlingham Red Gold 5506, *d.* Thorpe Countess 13635 by Tattingstone Beau Esprit 4927.
 150 **III. (£3).**—FRANK SAINSBURY, for foal, born March 22; *s.* Worlingham Red Gold 5506, *d.* Framlingham Juno 13717 by Blackmore Hopeful 5206.
 152 **R. N.**—OWEN H. SMITH, Langham, Oakham.

Class 23.—Suffolk Mares, born in or before 1927, not having a foal at foot. A mare 6 years old or over must have produced a live foal in 1930 or 1931.²

- 153 **I. (£15).**—P. A. BAYMAN, Letheringham Abbey, Woodbridge, for *Wanstead Matchless* 3rd 14149, born in 1926; *s.* Farnham Beatty 4942, *d.* Bouige Matchless 10152 by Sudbourne Bellman 4153.
 154 **II. (£10).**—E. S. BUCK & SON, Sycamore Farm, Raveningham, Norwich, for *Willingham Belle* 14278, born in 1926, bred by W. R. Frost, Willingham Hall, Beccles; *s.* Admiral John 5127, *d.* Belle by Henham Aerolite 4343.
 156 **III. (£5).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for *Bawdsey Minna* 14808, born in 1927, bred by Sir Cuthbert Quilter, Bart., Bawdsey Manor, Woodbridge; *s.* Worlingham Red Gold 5506, *d.* Bawdsey Minerva 6449 by Bawdsey Harvester 3076.
 155 **R. N.**—MRS. EVELYN RICH, Wretham Hall, Thetford, for *Annette Girl*.

Class 24.—Suffolk Fillies, born in 1928.

- 157 **I. (£20).**—P. ADAMS & SONS, Laurel Farm, Felixstowe, for *Laurel Keepsake* 14926; *s.* Shotley Counterpart 4903, *d.* Bawdsey Propriety 11855 by Bawdsey Hay 4188.
 162 **II. (£10).**—OWEN H. SMITH, Langham, Oakham, for *Walton Bella* 15048, bred by Herbert Smith, Walton Grange, Felixstowe; *s.* Shotley Counterpart 4903, *d.* Walton Minnie 12061 by War Boy 4672.
 161 **III. (£5).**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for *Bawdsey Magnet* 15697; *s.* Culverden Cup-winner 5779, *d.* Bawdsey Juno 8911 by Bawdsey Harvest King 3879.
 158 **R. N.**—W. N. L. CHAMPION, Riddlesworth Hall, Thetford, for *Stratton Finale*.
H. C.—160. **C.**—159.

Class 25.—Suffolk Fillies, born in 1929.

- 167 **I. (£20, & R. N. for Champion.¹)**—ARTHUR T. PRATT, Morston Hall, Trimley, Ipswich, for *Morston Counter Peace* 2nd 15710; *s.* Shotley Counterpart 4903, *d.* Morston White Cross 8970 by Morston Gold Guard 4234.

¹ Champion Prize of £10 given by the Suffolk Horse Society for the best Mare or Filly.

² Prizes given by the Suffolk Horse Society.

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- 164 **II. (#10).**—P. ADAMS & SONS, Laurel Farm, Felixstowe, for *Laurel Beauty* 15361; s. Shotley Counterpart 4903, d. Bawdsey Propriety 11355 by Bawdsey Hay 4188.
 168 **III. (#5).**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for *Bawdsey Gallopade* 15672; s. Worlingham Red Gold 5506, d. Bawdsey Valeta 11349 by Bawdsey Hay 4188.
 170 **R. N.**—THE EARL OF STRADBROKE, Henham Hall, Wangford, Beccles, for *Henham Olive*. H. C.—165. C.—166.

Class 26.—Suffolk Fillies, born in 1930.

- 172 **I. (#20).**—W. G. HARVEY, Kentish Farm, Stisted, Braintree, for *Kentish Pride* 16087; s. Martley King of Diamonds 5772, d. Ashmoor Faithful 14199 by Shotley Counterpart 4903.
 176 **II. (#10).**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for *Bawdsey Secret* 16100; s. Sir Harry of Morston 5676, d. Bawdsey Surety 14225 by Sudbourne Premier 4968.
 178 **III. (#5).**—THE EARL OF STRADBROKE, Henham Hall, Wangford, Beccles, for *Henham Phyllis* 15939; s. Coney Weston Scarab 5524, d. Henham Louie 14166 by Sudbourne Bowman 5456.
 171 **IV. (#4).**—W. N. L. CHAMPION, Riddlesworth Hall, Thetford, for *Riddlesworth Claribel* 16067; s. Shotley Counterpoint 5609, d. Riddlesworth Belle 13608 by Sudbourne Beauchief 4215.
 H. C.—174. C.—177, 179.

Class 27.—Suffolk Geldings, by registered sires, born in or before 1928.¹

- 186 **I. (#20).**—A. NUNN SCARFE, The Brooks, Bildeston, Ipswich, for *Punch*, born in 1927, bred by G. A. Woodward & Son, Old Newton, Stowmarket; s. Blyford Seabroc 5467, d. Mendlesham Diana 9136.
 184 **II. (#10).**—SIR CUTHBERT QUILTER, BART., Bawdsey Manor, Woodbridge, for *Peter*, born in 1926; s. Worlingham Red Gold 5506, d. Bawdsey Sweet Sultan 9495 by Earl Gray 4219.
 185 **III. (#5).**—MRS. EVELYN RICH, Wretham Hall, Thetford, for *Peter*, born in 1925, bred by A. R. Crisp, Pippin Park, Lidgate, Newmarket; s. Sudbourne Bernard 5464, d. Cockfield Sunshade 7462 by Fomham Vanguard 3682.
 187 **IV. (#4).**—WRAY, SANDERSON & CO., LTD., Hull, for *Briton*, born in 1924, bred by B. S. King, Rushmere, Ipswich; s. Shotley Counterpart 4903, d. Duchess 8997 by Morston Gold Guard 4234.
 183 **R. N.**—R. & W. PAUL, LTD., Ipswich, for *Duke*.

Percherons.

Class 28.—Percheron Stallions, born in or before 1928.²

- 191 **I. (#20, & Champion.³)**—COL. ARTHUR DUGDALE, Sezincoate, Moreton-in-Marsh, for *Histon Drayman* 9th B 410, grey, born in 1927, bred by Chivers & Sons, Ltd., Histon, Cambridge; s. Lagor B 1, d. Prolifere B 191 by Jugal F 85444.
 192 **II. (#10, & R. N. for Champion.⁴)**—J. PIERPONT MORGAN, Wall Hall, Watford, for *Histon Drayman* 4th B 340, grey, born in 1925, bred by Chivers & Sons, Ltd., Histon, Cambridge; s. Lagor B 1, d. Ustache B 509 by Qualvados F 131498.
 190 **III. (#5).**—CHIVERS & SONS, LTD., Histon, Cambridge, for *Brampton Ingot* B. 339, dark grey, born in 1925, bred by H. R. Overman, Brampton Ash, Market Harborough; s. Hilderstone Watteau B 198, d. Brampton Eve B 431 by Lagor B 1.

Class 29.—Percheron Stallions, born in 1929.

- 196 **I. (#20, & Champion.⁴)**—J. PIERPONT MORGAN, Wall Hall, Watford, for *Orton Misanthrope* B 474, grey, bred by J. F. Montagu, Cold Overton Hall, Oakham; s. Misanthrope B 5, d. Ole B 62 by Jaddus F 89198.
 197 **II. (#10, & R. N. for Champion.⁴)**—H. H. TRUMAN, March, Cambs, for *March Viking* B 473, grey; s. Hache Viking B 144, d. Eastor B 415 by Iborea F 82972.
 198 **III. (#5).**—C. WILSON, Rischolme, Lincoln, for *Rischolme Sinbad* B 477, grey; s. Villabon B 276, d. Rischolme Siren B 504 by Misanthrope B 5.
 195 **R. N.**—J. PIERPONT MORGAN, for *Histon Matchless*.

Class 30.—Percheron Stallions, born in 1930.

- 200 **I. (#20).**—CHIVERS & SONS, LTD., Histon, Cambridge, for *Histon Grey Friar* B 493, light grey; s. Censé B 409, d. Ravine B 387 by Quornal B 41.
 201 **II. (#10).**—R. C. IRVING, Shenley Lodge, Ridge Hill, Barnet, for *Shenley Viking* B 501, dark grey, bred by J. Pierpont Morgan, Wall Hall, Watford; s. Hache Viking B 144, d. Baudrucho B 685 by Quorsy F 130286.

¹ Prizes, except Fourth, given by the Suffolk Horse Society.

² Prizes given by the British Percheron Horse Society.

³ Perpetual Silver Challenge Cup given by the British Percheron Horse Society for the best Stallion.

⁴ Perpetual Silver Challenge Cup given by the British Percheron Horse Society for the best Stallion in Classes 29 and 30 born in Great Britain.

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- 202 III. (#5)—J. PIERPONT MORGAN, Wall Hall, Watford, for Aldenham Sergeant B 489, dark grey; s. Histon Drayman 4th B 340, d. Serverie B 534 by Importun F 80576.
 203 R. N.—W. E. SWINBERTON, Crickley Barrow House, Northleach, Cheltenham, for Crickley Premier.

Class 31.—Percheron Mares, with their own foals at foot.

- 209 I. (#20, & Champion.¹)—J. PIERPONT MORGAN, Wall Hall, Watford, for Serverie B 534, grey, born in 1918 [foal by Histon Drayman 4th B 340], bred by M. Maillefert, Cruchet, Ventes de Bourse, Mesle sur Sarthe, France; s. Importun F 80576, d. Nazarene F 116845 by Healine F 75604.
 207 II. (#10.)—J. PIERPONT MORGAN, for Baudruche B 685, light grey, born in 1923 [foal by Histon Drayman 4th B 340], bred by L. Guion, Landes, Bellons, Quinse, Orne, France; s. Croisy F 130286, d. Mattiere F 114659 by Joyeux F 84874.
 204 III. (#6.)—THE BIRDSALL ESTATES CO., LTD., Birdsall, Malton, for Princeton Carmen B 999, grey, born in 1923 [foal by Princeton Donovan C 12847], bred by H.R.H. The Prince of Wales, K.G., Fekisko, Alta.; s. Job C 6448, d. Hazel C 6878 by Icare C 1573.
 208 R. N.—J. PIERPONT MORGAN, for Diabliesse.

Class 32.—Percheron Colt or Filly Foals, the produce of Mares in Class 31.

- 210 I. (#10.)—THE BIRDSALL ESTATES CO., LTD., Birdsall, Malton, for Birdsall July B 1002, black filly, born March 28; s. Princeton Donovan C 12847, d. Princeton Carmen B 999 by Job C 6448.
 215 II. (#5.)—J. PIERPONT MORGAN, Wall Hall, Watford, for grey filly, born March 18; s. Histon Drayman 4th B 340, d. Serverie B 534 by Importun F 80576.
 213 III. (#3.)—J. PIERPONT MORGAN, for grey colt, born January 27; s. Histon Drayman 4th B 340, d. Baudruche B 685 by Croisy F 130286.

Class 33.—Percheron Fillies, born in 1929.

- 216 I. (#20, R. N. for Champion.¹ & Champion.²)—CHIVERS & SONS, LTD., Histon, Cambridge, for Histon Gay Lady B 982, black; s. Carburateur B 403, d. Petronne B 176 by Japon F 84819.
 217 II. (#10, & R. N. for Champion.³)—CHIVERS & SONS, LTD., for Histon Grey Girl B 929, grey; s. Lagor B 1, d. Saga B 584 by Nonce F 117982.
 220 III. (#5.)—J. PIERPONT MORGAN, Wall Hall, Watford, for Radwinter Andrey B 904, grey, bred by J. Francis Taylor, Godfrey's Farm, Radwinter, Essex; s. Lagor B 1, d. Eastern Xanthina B 572 by Newport B 20.
 219 R. N.—J. PIERPONT MORGAN, for Aldenham Lady Grace.

Class 34.—Percheron Fillies, born in 1930.

- 224 I. (#20.)—CHIVERS & SONS, LTD., Histon, Cambridge, for Histon Bright Star B 979, dark grey; s. Censé B 409, d. Sourdiere B 819 by Nigaud F 111585.
 225 II. (#10.)—CHIVERS & SONS, LTD., for Histon Grey Lady B 987, dark grey; s. Censé B 409, d. Petronne B 176 by Japon F 84819.
 223 III. (#5.)—CHIVERS & SONS, LTD., for Histon Amoret B 978, dark grey; s. Censé B 409, d. Angleterre B 507 by Quompromis F 132021.
 222 R. N.—THE BIRDSALL ESTATES CO., LTD., Birdsall, Malton, for Princeton June.

Class 35.—Percheron Geldings, by registered sires, born in or before 1928.³

- 234 I. (#20.)—J. PIERPONT MORGAN, Wall Hall, Watford, for Bellman, grey, born in 1926, bred by the Earl of Kimberley, Kimberley House, Wymondham; s. Hobland Bellman B 160, d. Quomemde B 229 by Montretout F 106337.
 229 II. (#10.)—CHIVERS & SONS, LTD., Histon, Cambridge, for Monarch, grey, born in 1928; s. Villabon B 276.
 233 III. (#5.)—R. C. IRVING, Shenley Lodge, Ridge Hill, Barnet, for Shanley Quanteloux, dark grey, born in 1926, bred by Mr. Sout, Yarton, Oxford; s. Quanteloux B 35.
 232 R. N.—R. C. IRVING, for Shenley Fury.

Hunters.

Class 36.—Hunter Mares, with their own foals at foot.

- 243 I. (#20, & R. N. for Champion.⁴)—MRS. J. D. PATON, Hanslope Lodge, Bletchley, for 7388 Mystery 8th, bay, aged [foal by Brigand].
 240 II. (#10.)—EATON KIMBELL, The Grange, Great Brington, Northampton, for 4625 Sunstar, bay, born in 1911 [foal by Ghanmerin], bred by John Ashburner, Brandon, Coventry; s. Heliotrope.

¹ Perpetual Silver Challenge Cup given by the British Percheron Horse Society for the best Mare or Filly.

² Perpetual Silver Challenge Cup given by the British Percheron Horse Society for the best Filly in Classes 33 and 34 born in Great Britain.

³ Prizes given by the British Percheron Horse Society.

⁴ Champion Gold Medal given by the Hunters' Improvement and National Light Horse Breeding Society for the best Mare four years old and upwards, which must be either registered in the Hunter Stud Book, or the entry tendered within a month of the Award.

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- 246 III. (£5.)—FRANCIS SAMUELSON, Breckenbrough Hall, Thirsk, for 6218 Scottree, bay, born in 1923 [foal by Spartacus]; s. Flying Scot, d. 4965 Dream.
 236 IV. (£4.)—WALTER J. FRYER, Holme Park, Sonning, Berks, for 6553 Gaylarch, bay, born in 1924 [foal by Cartoon]; s. Gay Lally, d. 5847 Larch by Birk Gill 178.
 230 V. (£3.)—GEOFF KENYON, Armscote House, Stratford-on-Avon, for Nightlight, brown, born in 1923 [foal by Billy Orb].
 235 R. N.—MRS. PHILIP FLEMING, Grendon Hall, Grendon Underwood, Bucks, for Redwing 7th.
 H. C.—237.

Class 37.—Hunter Mares (Novice), with their own foals at foot.

- 250 I. (£20, & Champion.¹)—SIR HENRY H. A. HOARE, BART., Stourhead, Zeals, Wilts, for 5897 Lady Dorchester, chestnut, born in 1917 [foal by Loughton's Last 228].
 256 II. (£10.)—MAJOR V. D. S. WILLIAMS, Greens Norton Court, Towcester, for Wait and See, chestnut, born in 1921 [foal by The Vizier].
 248 III. (£5.)—CHARLES G. BEARD, West Hill, Leamington, for 6764 Westeria, bay, born in 1926 [foal by Brigand]; s. Captain Jack 158, d. 5764 Clematis by Denis Richard.
 254 IV. (£4.)—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs, for 7028 Topknot, chestnut, born in 1927 [foal by Golden Optic], bred by Fred Gibson, Everton, Retford; s. Top Covert, d. by Ethelbruce.
 249 R. N.—CAPT. J. A. G. EMMETT, Moreton Paddox, Moreton Morrell, Warwick, for Doon Lass.

Class 38.—Hunter Colt Foals, the produce of Mares in Classes 36 or 37.

- 259 I. (£15.)—MRS. PHILIP FLEMING, Grendon Hall, Grendon Underwood, Bucks, for Falcon, bay, born April 13, 1931; s. Brigand, d. 7288 Redwing 7th by Red Hand.
 260 II. (£10.)—MRS. J. D. PATON, Hanslope Lodge, Bletchley, for Highwayman, bay, born April 5, 1931; s. Brigand, d. 7388 Mystery 8th by Monfin.
 261 III. (£5.)—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs, for bay, born May 3, 1931; s. Golden Optic, d. 7028 Topknot by Top Covert.
 263 R. N.—J. & H. P. WEBSTER, Abbey Farm, Yedingham, West Heslerton, Malton.
 H. C.—257.

Class 39.—Hunter Filly Foals, the produce of Mares in Classes 36 and 37.

- 265 I. (£15.)—FAWCEIT HIGNETT, The Nook, West Derby, Liverpool, for chestnut, born March 3, 1931; s. Silver Grill, d. 6449 Flying Hornet by Scribby Drake.
 273 II. (£10.)—W. W. PRECOR, Cottage Farm, Hockley Heath, for bay, born April 2, 1931; s. Perfectus, d. 5221 Royalty 3rd by The Best.
 275 III. (£5.)—A. & D. WALKER, Woodhouse, Tutbury, Burton-on-Trent, for Vanity, bay, born April 2, 1931; s. Farman, d. Cora by Caubean.
 269 R. N.—EATON KIMBELL, The Grange, Great Brington, Northampton, for Sunbeam.
 H. C.—266.

Class 40.—Hunter Fillies, born in 1928.

- 281 I. (£20, & R. N. for Champion.²)—MRS. HOWARD MANDER, Trysull Manor, Wolverhampton, for 7275 Rose Mary 5th, brown, bred by W. B. Brown, Southolme, Slingsby, Yorks; s. Dunholm, d. 6570 Proud Mary by Proudbridge.
 284 II. (£10.)—MISS V. WELLESLEY, Ford House, Churchinford, Chard, for 7209 Juliet 4th, chestnut, bred by A. E. Terry, Quarrendon House, Aylesbury; s. Kingsborough, d. 7204 Stella 19th by Sundawn.
 277 III. (£5.)—JAMES J. EMERSON, Easby Hall, Great Ayton, Yorks, for 7540 Whoriton Lass, bay; s. Perlostium, d. Jane.

Class 41.—Hunter Fillies, born in 1929.

- 285 I. (£20, & Champion.³)—FRANCIS SAMUELSON, Breckenbrough Hall, Thirsk, for Express, bay; s. Erhwemos, d. 6218 Scottree by Flying Scot.
 286 II. (£10.)—MRS. S. C. COCKBURN, Budbrook Lodge, Warwick, for 7575 Perfect Lass, chestnut; s. Perfectus, d. 7646 Beauty 5th.
 291 III. (£5.)—FAWCEIT HIGNETT, The Nook, West Derby, Liverpool, for Redwing, chestnut; s. Jazz Band, d. Countess of Crage by Cupbearer.
 292 IV. (£4.)—J. E. JONES, Treworgan, Ross, Herefordshire, for 7345 Cardona 2nd, brown; s. Huntly Gowk, d. 6889 Cardona by Cardonald.
 290 R. N.—MISS E. M. HARRISON, Maer Hall, Newcastle, Staffs, for Bustle.

Class 42.—Hunter Fillies, born in 1930.

- 300 I. (£20.)—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for 7707 Swinton Harmony, dark brown; s. Aynsley, d. 6799 Swinton Honora by Dunholm.

¹ Champion Gold Medal given by the Hunters' Improvement and National Light Horse Breeding Society for the best Mare four years old and upwards, which must be either registered in the Hunter Stud Book, or the entry tendered within a month of the Award.

² Champion Gold Medal given by the Hunters' Improvement and National Light Horse Breeding Society for the best Filly not exceeding three years old, which must be either registered in the Hunter Stud Book, or the entry tendered within a month of the Award.

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- 298 II. (#10).—LIEUT.-COL. T. R. BADGER, Horningbold, Market Harborough, for 7556 Mildmay 2nd, bay, bred by W. G. Spencer, Wedgcock Park, Warwickshire; s. Perfectus, d. 7496 Mildmay by Captivation.
- 304 III. (#5).—THE HON. MRS. MICHAEL MASON, Eynsham Hall, Witney, for 7650 Pledita, chestnut, bred by Mrs. S. C. Cockburn, Budbrooke Lodge, Warwick; s. Perfectus, d. 7646 Beauty 5th.
- 303 R. N.—R. E. HOLLOCK, Stivichall Grange, Coventry, for Silver Biddy.

Class 43.—Hunter Geldings, born in 1928.

- 310 I. (#20).—G. M. GIBBS, Othorpe House, Slawston, Market Harborough, for Lowdham Friar 1278, brown; s. Austin Friars, d. 7451 Brackly by St Petersburg.
- 311 II. (#10).—MISS R. M. HARRISON, Maer Hall, Newcastle, Staffs, for Porcupine, chestnut, bred by Col. R. Gwynne, D.S.O., Folkington Manor, Polegate, Sussex; s. Brisl, d. 6412 Messina Jane by Messina.
- 307 III. (#5).—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for Swinton Tally Ho 1364, bay; s. Warrington, d. 4473 Truth 2nd by Satolma.
- 308 IV. (#4).—MRS. P. WENTWORTH BELL, Brunton House, Collingbourne, Wilts, for Interloper, bay, bred by the late T. Lonsdale, Temple Grafton Court, Alcester; s. Trespasser, d. Miss Leader by Galloping Simon.
- 310 R. N.—FRANCIS SAMUELSON, Breckenbrough Hall, Thirsk, for Moss Trooper. H. C.—309.

Class 44.—Hunter Geldings, born in 1929.

- 320 I. (#20).—MRS. M. S. ELLISON, Grey Gables, Broadway, Worcs, for Moonshine, brown, bred by T. Taylor, The Mount, Churchill, Oxford; s. Zarope, d. Sunset by Eager.
- 322 II. (#10).—J. E. JONES, Treworgan, Ross, Herefordshire, for Preston Cupid, bay, bred by the late Sir Edward Currie, Itton Court, Chepstow; s. Furor, d. Blue Wings by William Rufus.
- 323 III. (#5).—MRS. HOWARD MANDER, Trysull Manor, Wolverhampton, for Dunkirk 2nd 1400, chestnut, bred by W. B. Brown, Southolme, Slingsby, Yorks; s. Dunholm, d. 6570 Proud Mary by Proudbridge.
- 326 IV. (#4).—THE HON. ALEXANDER PARKER, Norton Curlicu, Warwick, for Penguin, chestnut; s. Perfectus, d. 6179 Quorndon Peggy.
- 328 V. (#3).—THE DOWAGER LADY PENRHYN, Wicken Park, Bletchley, for Horatio 1400, black; s. The Pilot, d. Nell by Chantaur.
- 332 R. N.—R. THOMPSON, East Town End Farm, Long Newton, Stockton-on-Tees, for Starlight.

Class 45.—Hunter Colts or Geldings, born in 1930.

- 341 I. (#20).—J. E. JONES, Treworgan, Ross, Herefordshire, for China Cock 1443, bay colt; s. Irawaddy, d. 6889 Cardona by Cardonald.
- 336 II. (#10).—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for Floreat, chestnut gelding; s. Silver Band, d. 6151 Flemish Queen by Pericles.
- 338 III. (#5).—JAMES J. EMERSON, Easby Hall, Great Ayton, Yorks, for Whorlton Boy, brown gelding; s. Kingborough, d. Rustic.
- 348 IV. (#4).—MISS V. WELLESLEY, Ford House, Churchinford, Chard, for Follow Suit, bay colt, bred by H. Clark, Stoke-under-Ham, Yeovil; s. Sysonby, d. 7135 Gingerbread 2nd.
- 339 V. (#3).—MRS. HENRY HAWKINS, Everdon Hall, Daventry, for Dewdrop 1436, dark brown colt; s. Roseland, d. 7299 Rainbow 3rd by Monkey Tricks.
- 340 R. N.—MRS. HENRY HAWKINS, for Hidden Treasure.

Special Produce First Prizes of £3 each given by the R.A.S.E., and Second Prizes of £1 each by the Hunters' Improvement and National Light Horse Breeding Society, for the two best groups of three animals in Classes 40 to 45, by the same Thoroughbred or Registered Hunter Sire. A Gold Medal was given by the H.I. & N.L.H.B.S. to the owner of the sire of the winning group, and a Silver Medal to the owner of the sire of the second group.

Sired by EREHWEMOS.

- 295 Empress, bay filly, exhibited by FRANCIS SAMUELSON.
- 316 Moss Trooper, bay gelding, exhibited by FRANCIS SAMUELSON.
- 332 Starlight, black gelding, exhibited by R. THOMPSON.

Sired by PERFECTUS.

- 286 Perfect Lass, chestnut filly, exhibited by MRS. S. C. COCKBURN.
- 298 Mildmay 2nd, bay filly, exhibited by LIEUT.-COL. T. R. BADGER.
- 326 Penguin, chestnut gelding, exhibited by the HON. ALEXANDER PARKER.

Polo and Riding Ponies.

Class 46.—*Polo and Riding Pony Stallions, born in or before 1928, not exceeding 15 hands.*

- 351 I. (#20, & Champion.¹)—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls, Romsey, Hants, for Malice 1871, chestnut, born in 1920, bred by Frank J. Balfour, Argentina; s. Malandante, d. 5133 Alicia by Belsire 658.
 349 II. (#10, & R. N. for Champion.¹)—CAPT. W. H. FRANCE-HAYHURST, Bostock Hall, Middlewich, for Silverdale Loyalty 1448, brown, born in 1923, bred by H. Bright, The Cove, Silverdale, Carnforth; s. Prince Friarstown, d. 4168 Silvery by Right For'ard 368.
 353 III. (#5.)—SIR IAN WALKER, BART., Osmaston Manor, Derby, for Collier 1752, bay, born in 1928, bred by Mrs. L. Tate, Swynford Lodge, Rugby; s. Pit Boy, d. Golden Dahlia by Dalmellington.

Class 47.—*Polo and Riding Pony Colts, Fillies or Geldings, born in 1930.*

- 357 I. (#20, & R. N. for Champion.²)—MISS B. G. CORY-WRIGHT, Norcote Hill, Berkhamsted, for Cassia 2nd, bay or brown filly; s. Gold Eagle, d. Spice.
 364 II. (#10.)—SIR IAN WALKER, BART., Osmaston Manor, Derby, for Eau de Nile, chestnut filly; s. Tabarin 1682, d. Rochette by Amadis.
 359 III. (#5.)—TRESHAM GILBEY, Whitehall, Bishop's Stortford, for Mill Bridge, chestnut colt, s. Bridgewater, d. Prairie Flower.
 355 R. N.—H. BRIGHT, The Cove, Silverdale, Carnforth, for Silverdale Tarragon.

Class 48.—*Polo and Riding Pony Colts, Fillies or Geldings, born in 1929.*

- 365 I. (#20, & Champion.² & R. N. for Champion.²)—H. BRIGHT, The Cove, Silverdale, Carnforth, for Silverdale Madrigal, chestnut filly; s. Silverdale Cheerio 1320, d. 3151 Cherry by Fort Myers.
 370 II. (#10.)—MRS. F. J. HOLMES, Middleton Stoney, Bicester, for Merry Maid 4th, strawberry roan filly; s. Greenback, d. Rambler 4th.
 371 III. (#5.)—LADY HUNLOKE, Cowbridge, Malmesbury, for Wingerworth Jade, bay colt; s. Wild Tint 1207, d. 5737 Syllabus by Barbed Fence.
 368 R. N.—TRESHAM GILBEY, Whitehall, Bishop's Stortford, for Tintina.
 H. C.—366.

Class 49.—*Polo and Riding Pony Fillies or Geldings, born in 1928.*

- 375 I. (#20.)—TRESHAM GILBEY, Whitehall, Bishop's Stortford, for Butter Scotch, chestnut gelding, bred by the late J. Streeter, Thorley Place, Bishop's Stortford; s. Bridgewater, d. Butter-Cup.
 377 II. (#10.)—SIR IAN WALKER, BART., Osmaston Manor, Derby, for Carouse, brown gelding; s. Tabarin 1682, d. Dusk 2nd by Hanover Square.
 374 III. (#5.)—H. BRIGHT, The Cove, Silverdale, Carnforth, for Silverdale Pamela, chestnut filly; s. Silverdale Cheerio 1320, d. Parnassia by Count Schomberg.
 376 R. N.—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls, Romsey, Hants, for Malanet.

Class 50.—*Polo and Riding Pony Mares, with their own foals at foot, not exceeding 15 hands.*

- 378 I. (#20, Champion.² & R. N. for Champion.⁴)—H. BRIGHT, The Cove, Silverdale, Carnforth, for 3151 Cherry, bay, born in 1913 [foal by Silverdale Cheerio 1320], bred by Lieut.-Col. Nicholl, Merthyr Mawr, Bridgend; s. Fort Myers, d. Vanity.
 380 II. (#10.)—MISS B. G. CORY-WRIGHT, Norcott Hill, Berkhamsted, for Harietta, chestnut, born in 1918 [foal by Gold Eagle, bred by the late Lord Middleton, Birdsall Manor, Milton; s. Sir Harry, d. Fair Gertrude by Red Eagle.
 386 III. (#5.)—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls, Romsey, Hants, for Rahema, bay, born in 1923 [foal by Malice 1871].
 383 IV. (#4, & Champion.⁴)—MRS. DAVIES-COOKE, Gwynsany, Mold, North Wales, for Silver 4th, grey, born in 1916 [foal by Friar 1881], bred by Mr. Mitchell, St. Dennis, Cornwall; s. Irish Linen, d. May Queen by Golden Petrel.
 381 R. N.—MRS. DAVIES-COOKE, for Calla.
 H. C.—385. C.—379, 384.

¹ Champion Gold Medal given by the National Pony Society for the best Stallion or Colt.

² Champion Silver Medal given by the National Pony Society for the best Filly.

³ Champion Gold Medal given by the National Pony Society for the best Mare or Filly.

⁴ Bronze Medal given by the National Pony Society for the best Foal in Class 50 entered in the Supplement to the National Pony Stud Book.

Welsh Mountain Ponies.

Class 51.—Welsh Mountain Pony Stallions, born in or before 1928, not exceeding 12 hands.

- 391 I. (#15).—LORD SWANSEA, D.S.O., M.V.O., Caer Beris, Bullth, Breconshire, for Caer Beris King Cole 940, white, born in 1917, bred by Mrs. H. D. Greene, The Grove, Craven Arms; s. Grove King Cole 2nd 565, d. 4431 Grove Sprite 2nd by Grove Ballistite 200.
- 389 II. (#10).—JOHN JONES & SON, Dinarth Hall, Colwyn Bay, for Faraam Mercury 1813, grey, born in 1924, bred by F. Fitch Mason, The Faraam, Killay, Glam; s. Bwlch Quicksilver 748, d. 3758 Clumber Janet 3rd.
- 390 III. (#5).—THE MISSES MAY AND SUMMERS, Manor House, Rodney Stoke, Cheddar, Som., for Lydbury Rocket 1456, grey, born in 1927; s. Grove Eldin 729, d. 8309 Llwyn Venus by Kilhendre Celtic Silverlight 953.

Class 52.—Welsh Mountain Pony Mares, with their own foals at foot, not exceeding 12 hands.

- 396 I. (#15).—MISS M. BRODRICK, Coed Cŏch, Abergele, for 8539 Coed Cŏch Seren, brown, born in 1925 [foal by Dinarth Spark]; s. Grove Sharp Shooter 1259, d. 8257 Coed Cŏch Eirlys by Stretton Sweep 246.
- 401 II. (#10).—THE MISSES MAY AND SUMMERS, Manor House, Rodney Stoke, Cheddar, Som., for 8568 Towry Vale Delight, brown, born in 1920 [foal by Kilhendre Celtic Meteor 1456], bred by the late W. S. Miller, Forest Lodge, Brecon; s. Forest Chief 944, d. 6574 Forest Brave Lu-la.
- 397 III. (#5).—MRS. INGE, Thorpe, Tamworth, for 6975 Brynhir White Star, white, born in 1918 [foal by Cairn], bred by Walter S. Glynn, The Grange, Bletchley; s. Bledfa Shooting Star 73, d. by Grove Ballistite 200.
- 392 IV. (#4).—MRS. F. BRIAN BIBBY, Sansaw, Shrewsbury, for 5782 Grove Limestone, light grey, born in 1916 [foal by Faraam Mercury 1813], bred by Mrs. H. D. Greene, The Grove, Craven Arms; s. Bledfa Shooting Star 73, d. 3002 Grove Limelight by Dyoll Starlight 4.
- 395 R. N.—MISS M. BRODRICK, for Coed Cŏch Eirlys.

Riding Classes.¹

HUNTERS.

Class 55.—Hunter Mares or Geldings, born in 1927.

- 410 I. (#15).—HAROLD GRAINGER, Boston Spa, Yorks, for Welsh Fox, chestnut roan gelding, bred by Geo. Dickinson, Cark-in-Cartmel; s. Silver Fox, d. by Wales.
- 423 II. (#10).—THE HON. ANNE LEWIS, Hean Castle, Saundersfoot, Pembrokeshire, for Dunkirk, chestnut gelding, bred by F. Parker, Woodhouse Farm, Weston, Malton; s. Dunholm, d. by Ardoon.
- 420 III. (#5).—HERBERT KNIGHT, Apple Tree Court, Lyndhurst, Hants, for Washed Out, bay gelding; s. Tidal Wave, d. Magic by Malleray.
- 412 IV. (#3).—O. A. GREENSLADE, The Lodge, Chesterton, Leamington Spa, for Easter Egg, golden chestnut gelding; s. Political.
- 422 R. N.—C. M. LAZENBY, Hyde Mill, Stow-on-the-Wold, for Quarter Day.
- R. C.—416.

Class 56.—Mares or Geldings (Novice), born in or before 1927, up to from 12 to 14 stones.

- 410 I. (#15).—HAROLD GRAINGER, for Welsh Fox. (See Class 55.)
- 423 II. (#10).—WALTER S. BUCKMASTER, Moreton Morrell, Warwick, for Shillelagh, bay-brown gelding, born in 1923.
- 448 III. (#8).—T. OSBORNE, Manor Farm, Earlswood Lakes, Warwickshire, for Red Chial, chestnut gelding, born in 1926, bred by the late Mr. Farr, Louth, Lincs; s. Mankato, d. Fair Hair by Cyllind.
- 423 IV. (#3).—THE HON. ANNE LEWIS, for Dunkirk. (See Class 55.)
- 420 R. N.—HERBERT KNIGHT, for Washed Out.
- R. C.—452.

Class 57.—Mares or Geldings (Novice), born in or before 1927, up to more than 14 stones.

- 456 I. (#15).—CAPT. J. C. G. KIRKPATRICK, Three Gates, Moreton Morrell, Warwick, for Bloodstone, bay gelding, born in 1926.
- 419 II. (#10).—GEOFF KENYON, Armscote House, Stratford-on-Avon, for Brown Mole, black chestnut gelding, born in 1913.

¹ Prizes given by the Warwick Local Committee.

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- 457 III. (25).—MAJOR W. HARCOURT WEBB, Spring Grove, Bewdley, Worcs, for Jorrocks, bay gelding, born in 1926.
471 IV. (23).—MAJOR R. L. GREENSHIELDS, Park House, Kinston, Warwick, for Dick, grey gelding, born in 1926.

Class 58.—Mares or Geldings, born in or before 1926, up to not more than 14 stones, suitable to carry a lady, and to be ridden by a lady side-saddle.

- 443 I. (£15).—LADY HILLINGDON, Wakefield Lodge, Pottersbury, Northampton, for Rue Barrée, brown mare, born in 1925; s. Trespasser, d. Countersign.
462 II. (£10).—THE HON. DOROTHY PAGET, Leeds Castle, Maidstone, for Bloodstone 1404, brown gelding, born in 1922, bred by Capt. V. H. Holt, Lingmoor, Kirbymoorside; s. Sandstone, d. by Raheen.
433 III. (25).—WALTER S. BUCKMASTER, for Shillelagh. (See Class 56.)
440 IV. (23).—W. J. SMITH, LTD., 21, Little Cadogan Place, London, S.W.1, for Majestic, bay gelding.
411 E. N.—MISS N. C. SUGDEN, 6, Langcliffe Avenue, Harrogate, for Ronald.
H.C.—446. C.—435.

Class 59.—Mares or Geldings, born in or before 1927, up to from 12 to 13.7 stones.

- 443 I. (£20).—LADY HILLINGDON, for Rue Barrée. (See Class 58.)
449 II. (£15).—W. J. SMITH, LTD., for Majestic. (See Class 58.)
448 III. (£10).—T. OSBORNE, for Red Chief. (See Class 56.)
465 IV. (25).—MRS. BASIL YOUNG, Wodards Close, Fritwell, Bicester, for Golden Arrow 2nd 1455, chestnut gelding, born in 1923.
418 V. (23).—GEOFF KENTON, Armscote House, Stratford-on-Avon, for Discord, chestnut gelding, born in 1926.
461 E. N.—J. E. JONES, Treworgan, Ross, Herefordshire, for Astonishment.
H.C.—446.

Class 60.—Mares or Geldings, born in or before 1927, up to more than 13.7 and not more than 15 stones.

- 470 I. (£20, & Champion).—MRS. E. M. VAUGHAN, Blackladies, Brewwood, Stafford, for Healand 1412, chestnut gelding, born in 1925, bred by H. Holby, Middledale, Driffield; s. Hector.
433 II. (£15).—WALTER S. BUCKMASTER, for Shillelagh. (See Class 56.)
462 III. (£10).—THE HON. DOROTHY PAGET, for Bloodstone. (See Class 58.)
467 IV. (25).—CAPT. V. H. HOLT, Ravenswick, Kirbymoorside, York, for Fascist 1372, chestnut gelding, born in 1926, bred by W. V. McNeil, Normanby, Whitby; s. Flying Scot, d. by Belagio.
411 V. (23).—MISS N. C. SUGDEN, 6, Langcliffe Avenue, Harrogate, for Ronald, bay gelding, born in 1926, bred by Major Peake, Bawtry, Doncaster; s. Halestar.
456 E. N.—CAPT. J. C. G. KIRKPATRICK, for Bloodstone.

Class 61.—Mares or Geldings, born in or before 1927, up to more than 15 stones.

- 476 I. (£20, & R. N. for Champion).—LADY HELEN McCALMONT, Mount Juliet, Thomastown, Kilkenny, for Handley Cross, chestnut gelding, born in 1924.
419 II. (£15).—GEOFF KENTON, for Brown Mole. (See Class 57.)
437 III. (£10).—JOHN DARBY, Hillmorton, Rugby, for Liberty, bay gelding, born in 1925.
471 IV. (25).—MAJOR R. L. GREENSHIELDS, for Dick. (See Class 57.)

HACKS.

Class 62.—Hack Mares or Geldings, not exceeding 15 hands.

- 487 I. (£15, & Champion).—LIEUT.-COL. SIR ARCHIBALD WEIGALL, K.C.M.G., Englemere, Ascot, for Radiant, bay gelding, born in 1925, bred by J. Walker, Worcester; s. Regent, d. Amnity.
485 II. (£10).—MAJOR R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, for Minnewaska, bay mare, born in 1924.
483 III. (25).—MISS PEGGY PACEY, Clifton Hall, Rugby, for Snap Dragon, brown gelding, born in 1924.
477 IV. (23).—MRS. PHILIP FLEMING, Grendon Hall, Grendon Underwood, Bucks, for Moonlight, black gelding, born in 1926.
482 E. N.—LADY MURIEL LIDDELL-GRAINGER, Ayton Castle, Berwickshire, for Mida.

Class 63.—Hack Mares or Geldings, over 15 hands.

- 486 I. (£15, & R. N. for Champion).—MAJOR R. M. STEWART RICHARDSON, Idover House, Dauntsey, Chippenham, for Minnetonka, bay mare, born in 1927.
496 II. (£10).—MISS G. M. YULE, Hanstead House, Bricket Wood, Herts, for Shecanhopit, bay mare, born in 1925.

¹ Gold Challenge Cup given by gentlemen interested in Hunters for the best Mare or Gelding.

² Silver Challenge Cup given by a Member of the R.A.S.E. for the best Hack.

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- 491 III. (#5).—MISS BETTY KEMP-WELCH, 147, Victoria Street, London, S.W.1, for Rising Star, chestnut gelding, born in 1924.
 492 IV. (#3).—THE DOWAGER LADY PENRYN, Wicken Park, Bletchley, for Manoury, chestnut gelding, born in 1925.
 470 R. N.—MRS. PHILIP FLEMING, Grendon Hall, Grendon Underwood, Bucks, for Olive Dun.

Class 64.—Hack Mares or Geldings, suitable to carry a lady and to be ridden by a lady side-saddle.

- 487 I. (#15).—LIEUT.-COL. SIR ARCHIBALD WEIGALL, K.C.M.G., for Radiant. (See Class 62.)
 492 II. (#10).—THE DOWAGER LADY PENRYN, for Manoury. (See Class 63.)
 486 III. (#5).—MAJOR R. M. STEWART RICHARDSON, for Minnetonka. (See Class 63.)
 496 IV. (#3).—MISS G. M. YULE, for Shecanhopit. (See Class 63.)
 491 R. N.—MISS BETTY KEMP-WELCH, for Rising Star.
 H. C.—485.

CHILDREN'S PONIES.

Class 65.—Pony Mares or Geldings, not exceeding 13 hands, to be ridden by a child born in or after 1921.

- 508 I. (#10).—MISS PEGGY PACEY, Clifton Hall, Rugby, for Mickie, grey gelding, born in 1921,
 504 II. (#5).—LADY MURIEL LIDDELL-GRAINGER, Ayton Castle, Berwickshire, for Quicksilver, grey mare, born in 1923.
 510 III. (#3).—MASTER MAURICE A. TATLOW, Brome Hall, Lapworth, Birmingham, for Grey Bird, grey mare, born in 1926.
 507 R. N.—ANDREW MASSARELLA, Belmont, Bentley, Doncaster, for Steel Dust.
 H. C.—511.

Class 66.—Pony Mares or Geldings, over 13 and not exceeding 14 hands, to be ridden by a child born in or after 1918.

- 519 I. (#10).—MRS. F. A. SINGLE, Bryngwyn Manor, Raglan, Mon., for Lapis Lazuli, bay mare, born in 1924.
 520 II. (#5).—W. J. SMITH, LTD., 21, Little Cadogan Place, London, S.W.1, for Tulip, chestnut mare.
 517 III. (#3).—CAPT. J. C. G. KIRKPATRICK, Three Gates, Moreton Morrell, Warwick, for Barney, bay gelding, born in 1926.
 513 R. N.—MISS MERCY COCKBURN, Budbrook Lodge, Warwick, for Peter.
 H. C.—516.

Class 67.—Pony Mares or Geldings, over 14 and not exceeding 15 hands, to be ridden by a child born in or after 1915.

- 483 I. (#10).—MISS PEGGY PACEY, for Snap Dragon. (See Class 62.)
 524 II. (#5).—J. S. STANHOPE, Claybrooke, Rugby, for Lady Gay, chestnut mare, born in 1925.
 521 III. (#3).—MISS MERCY COCKBURN, Budbrook Lodge, Warwick, for Lady Dibs, bay mare, born in 1925.
 529 R. N.—MISS N. WRIGHT, Olton Farm, Solihull, Birmingham, for June.

Driving Classes.¹

SINGLE HARNESS.

Class 68.—Mares or Geldings (Novice), not exceeding 14 hands.

- 530 I. (#15, & R. N. for Champion).—A. R. FISH, Holmes Mead, Hutton, Preston, for 26807 Penwortham Opera Girl, dark grey, born in 1927, bred by Robert Billington, Studholme, Penwortham; s. Royal Success 8995, d. 26136 Glenavon Torchelle by Torchfire 9473.
 535 II. (#10).—WILLIAM S. MILLER, Balmanno Castle, Bridge of Earn, for Mr. Cinders G 783, brown gelding, born in 1927, bred by H. T. Holloway, West Lavington, Wilts; s. Talke Bonfire 14178, d. 26058 Barlaston Lady by Fireboy 7440.
 536 III. (#5).—JOHN GELLER, 249, High Road, Leytonstone, for 26783 Little Music, bay mare, born in 1926, bred by J. E. Kerr, Harviestoun, Dollar; s. Sir Andra 14205, d. 18366 Little Warren by Julius Caesar 5866.
 546 R. N.—PAUL HOFFMANN, 4, Cardigan Mansions, Richmond Hill, Surrey, for Orford Caprice.
 H. C.—551. C.—428.

Class 69.—Mares or Geldings (Novice), over 14 and not exceeding 15 hands.

- 532 I. (#15).—J. W. G. SMITH, Wensleydale Stud, Aysgarth, Yorks, for 26929 Wensleydale Madge, bay roan mare, born in 1927; s. Buckley Courage 13771, d. 23946 Garston Madge by Leopard 9783.

¹ Prizes given by the Warwick Local Committees.

² The "Glasgow" Silver Challenge Cup given by a Member of the R.A.S.E. for the best animal in the Novice Classes.

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- 548 II. (#10).—PAUL HOFFMANN, 4, Cardigan Mansions, Richmond Hill, Surrey, for Orford Pioneer G 661, bay gelding, born in 1925, bred by Enoch Glen, Bathgate, Scotland; s. Ophelius 13344, d. by Westfield Polonus 9968.
- 539 III. (#5).—MRS. EDGAR HENRIQUES, Fernholm, Hesketh Park, Southport, for Fleetwood Courageous G 547, chestnut gelding, born in 1924, bred by the late C. F. Kenyon, Steele, Whitechurch, Shropshire; s. Buckley Courage 13771, d. 23399 Wood Nicety by Antonius 10559.
- 553 R. N.—WALTER MACMILLAN, Mambeg House, Garelochhead, Dumbarton, for Gold Flake.
H. C.—564.

Class 70.—Mares or Geldings (Novice), over 15 hands.

- 531 I. (#15, & Champion.)—A. R. FISH, Holme Mead, Hutton, Preston, for 26795 Glenavon Solitaire, bay mare, born in 1927, bred by Enoch Glen, Bathgate, Scotland; s. Ophelius 13344, d. 21707 The Whip by Leopard 9783.
- 540 II. (#10).—MRS. EDGAR HENRIQUES, Fernholm, Hesketh Park, Southport, for Fleetwood Conqueror G 729, dark chestnut gelding, born in 1926, bred by Albert Throup, Stud Farm, Wyde Green, Birmingham; s. Buckley Courage 13771, d. 23880 Tudor Empress by Mathias 6473.
- 549 III. (#5).—PAUL HOFFMANN, 4, Cardigan Mansions, Richmond Hill, Surrey, for 26688 Orford Romance, dark chestnut mare, born in 1925, bred by the late T. B. Colman, Norwich; s. Admiral Crichton 9578, d. 25849 Bridgham Bright Girl by King's Proctor 11102.

Class 71.—Mares or Geldings, not exceeding 13.2 hands.

- 556 I. (#15, & R. N. for Champion.)—WILLIAM S. MILLER, Balmanno Castle, Bridge of Earn, for Jix G 625, bay gelding, born in 1924, bred by Mrs. Paget Steavenson, Southmoor, Abingdon; s. Southworth Swell 11219, d. 22249 Talke Duchess by Talke Fire King 9932.
- 530 II. (#10).—A. R. FISH, for Penwortham Opera Girl. (See Class 68.)
- 536 III. (#5).—JOHN GELLER, for Little Music. (See Class 68.)
- 551 R. N.—WALTER MACMILLAN, Mambeg House, Garelochhead, Dumbarton, for Miss Appleby.
H. C.—428, 541.

Class 72.—Mares or Geldings, over 13.2 and not exceeding 14 hands.

- 533 I. (#15).—ROBERT H. MCCOLL, 9, Sherbrooke Avenue, Pollokshields, Glasgow, for 26557 Braishfield Sonnet, chestnut mare, born in 1922, bred by Mrs. A. C. King, Braishfield, Romsey, Hants; s. Royal Success 8995, d. 21085 Tissington Carol by Tissington Gideon 9042.
- 560 II. (#10).—WILLIAM S. MILLER, Balmanno Castle, Bridge of Earn, for Regal Presence G 609, bay gelding, born in 1924, bred by Enoch Glen, Bathgate, Scotland; s. Melbourne Adre 13942, d. 23129 Glenavon Princess Caprice by Fireboy 7440.
- 565 III. (#5).—S. E. MOSS, St. Fabian's Drive, Chelmsford, for 25732 Highbrough Princess, bay mare, born in 1921, bred by J. E. Rushworth, Eskdale, Bargate, Grimsby; s. Southworth Swell 11219, d. 23622 Holland Hespera by Southworth Swell 11219.
- 538 R. N.—MRS. EDGAR HENRIQUES, Fernholm, Hesketh Park, Southport, for Fleetwood Totem.

Class 73.—Mares or Geldings, over 14 and not exceeding 15 hands.

- 534 I. (#15, & Champion.)—FRANK W. BUTTLE, Kirholm, Deepdale Avenue, Scarborough, for Shalimar G 679, chestnut gelding, born in 1923, bred by Dr. Bowie, Colnbrook, Bucks; s. Mathias A1, 10751, d. 23105 Flower Princess by King's Proctor 11102.
- 542 II. (#10).—MRS. EDGAR HENRIQUES, Fernholm, Hesketh Park, Southport, for 26770 Fleetwood Nanette, chestnut mare, born in 1925, bred by the late Herbert H. Parry, Springfield, Calne, Wilts; s. Lavington Leader 13803, d. 23073 Defiant Princess by Polonus 4931.
- 548 III. (#5).—PAUL HOFFMANN, for Orford Pioneer. (See Class 69.)
- 553 R. N.—WALTER MACMILLAN, for Gold Flake.

Class 74.—Mares or Geldings, over 15 and not exceeding 15.2 hands.

- 540 I. (#15).—MRS. EDGAR HENRIQUES, for Fleetwood Conqueror. (See Class 70.)
- 429 II. (#10).—F. C. MINOFRIO, Avening Court, Avening, Glos, for Pollux G 775, bay gelding, born in 1924, bred by Lord Ashtown, Woodlawn, Co. Galway; s. Woodlawn A.D.C. 14001, d. 25704 Woodlawn Merry May by Sir Augustus 5562.
- 550 III. (#5).—PAUL HOFFMANN, 4, Cardigan Mansions, Richmond Hill, Surrey, for 26628 Orford Melisse, dark chestnut mare, born in 1925, bred by J. W. G. Smith, Aysgarth, Yorks; s. Angram Majesty 11967, d. 23375 Towthorpe Alette by Polonus 4931.

¹ The "Glasgow" Silver Challenge Cup given by a Member of the R.A.S.E. for the best animal in the Novice Classes.

² The "Balmanno" Silver Challenge Cup given by a Member of the R.A.S.E. for the best animal in Classes 71 to 75.

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Class 75.—*Mares or Geldings, over 15·2 hands.*

- 568 I. (£15.).—T. W. GEORGE, Moseley Street, Birmingham, for 26281 Tudor Rose, chestnut mare, born in 1921, bred by Dr. H. S. Chavasse, High Street, Sutton Coldfield; s. Haydon's King Rufus 12860, d. 23380 Tudor Empress by Mathias 6473.
- 544 II. (£10.).—MRS. EDGAR HENRIQUES, Fernholm, Hesketh Park, Southport, for Fleetwood Crusader G 541, bay gelding, born in 1923, bred by the late C. F. Kenyon, Steele, Whitchurch, Shropshire; s. Buckley Courage 13711, d. 25010 Hullo Starlight by Antonus 10559.
- 549 III. (£5.).—PAUL HOFFMANN, for Orford Romance. (See Class 70.)

DOUBLE HARNESS.

Class 76.—*Mares or Geldings.*

- 559 & 560 I. (£15.).—WILLIAM S. MILLER, Balmanno Castle, Bridge of Earn, for Fuse Junior G 560, bay gelding, born in 1925; s. Braishfield Fuse 13567, d. 25150 Buckley Poppy by Little Briton 11813; and Regal Presence. (See Class 72.)
- 539 & 542 II. (£10.).—MRS. EDGAR HENRIQUES, for Fleetwood Courageous (see Class 69) and Fleetwood Nanette (see Class 73).
- 429 & 430 III. (£5.).—F. C. MINOPRIO, for Pollux (see Class 74) and Castor G 651, bay gelding, born in 1922, bred by E. O. Boston, Wylde Green, Birmingham; s. Haydon's King Rufus 12860, d. 20266 Suffragette by Garton Duke of Connaught 3009.
- 549 & 550 R. N.—PAUL HOFFMANN, for Orford Romance and Orford Eclipse. C.—564 & 565.

TANDEMS.

Class 77.—*Mares or Geldings.*

- 539 & 542 I. (£15.).—MRS. EDGAR HENRIQUES, for Fleetwood Courageous (see Class 69) and Fleetwood Nanette (see Class 73).
- 429 & 430 II. (£10.).—F. C. MINOPRIO, for Pollux (see Class 74) and Castor (see Class 76).
- 564 & 565 III. (£5.).—S. E. MOSS, for Gay Lad, bay gelding, born in 1927, bred by W. W. Taylor, Camel Stud Farm, Loose, Maidstone; s. Merely Searchlight Chicken, d. 20250 Spring Chicken by Mathias 6473; and Habrough Princess (see Class 72).
- 549 & 550 R. N.—PAUL HOFFMANN, for Orford Romance and Orford Eclipse.

CATTLE.

Shorthorns.

Class 78.—*Shorthorn Bulls, born in or before 1928.*

- 573 I. (£15, Champion, Champion,¹ & Champion.²)—A. J. MARSHALL, Bridgebank, Stranraer, for Balcairn Colonel 227865, red, born March 24, 1923, bred by F. W. Wallace, Balcairn, Oldmeldrum; s. Balcairn Welcome Duke 218130, d. 31319 Balcairn Coltsfoot by Earl of Kingston 120041.
- 574 II. (£10.).—A. J. MARSHALL, for Cruggleton Patrician 229491, roan, born Feb. 21, 1928; s. Balcairn Baronet 153566, d. Princess Christina by Broadhooks Diamond 124580.
- 572 III. (£5.).—R. S. MOWILLIAM, Garguston, Muir of Ord, Ross-shire, for Rosehaugh Clipper Star 239944, red roan, born Nov. 3, 1927, bred by Mrs. Fletcher, Rosehaugh, Avonh; s. Collynie Royal Leader 188656, d. 2926 Rosehaugh Clipper 2nd by Fairlawne Radium 186454.
- 575 R. N.—J. PERCY RAYNER, Bliton Hall, York, for Alkbank Royal Star. H. C.—570. C.—576.

Class 79.—*Shorthorn Bulls, born on or between January 1 and March 31, 1929.⁴*

- 579 I. (£15.).—A. J. MARSHALL, Bridgebank, Stranraer, for Cruggleton Samson 236499, dark roan, born March 13; s. Collynie Baron Excellence 222202, d. 15742 Secret Emerald by Fairlawne Red Lion 142322.
- 578 II. (£10.).—J. D. KRY, Clifton Mill, Rugby, for Stonelands Royal Eagle 240525, dark roan, born Jan. 1, bred by Norman N. Lee, Stonelands, Arnccliffe, Skipton-in-Graven; s. Collynie Red Eagle 214703, d. 15084 Princess Isabel by Bridgebank Romance 147552.
- 579, 589, 634 Special I. (£15.).—A. J. MARSHALL, for Cruggleton Samson, Cruggleton Searchlight and Jealous Betsy.

¹ Champion Prize of £20 given by the Shorthorn Society for the best Bull. A Silver Medal was given by the Shorthorn Society to the Breeder of the Champion Bull.

² Silver Challenge Cup given by the Argentine Shorthorn Breeders' Association for the best Bull.

³ The "Brothers Colling" Memorial Perpetual Challenge Cup presented through the Durham Agricultural Committee for the best Shorthorn.

⁴ Prizes given by the Shorthorn Society.

⁵ Special Prizes of £15 First Prize and £10 Second Prize given by the Shorthorn Society for the best groups of three animals bred by Exhibitor.

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- 374, 585, 627 **Special II. (£10).**¹—A. J. MARSHALL, for **Cruggleton Patrician**, Cruggleton Accolade and Cruggleton Prideaux.
635, 652, 661 **E. N. for Specials.**²—ALEXANDER & ADDIE, for **Cambus Orange Blossom 2nd**, **Cambus Butterfly 8th** and **Cambus Lady Broadhooks**.

Class 80.—*Shorthorn Bulls, born on or between April 1 and December 31, 1929.*

- 584 **I. (£15, E. N. for Champion.**³ **E. N. for Champion.**⁴ **E. N. for Champion.**⁵)—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for **Cluny Rosewood Rover 236117**, dark roan, born April 17, bred by Lady Cathcart, Cluny Castle, Aberdeen; s. Red Robin 210743, d. Cluny Rosewood by President of the Mint 109670.
589 **II. (£10).**—A. J. MARSHALL, Bridgebank, Stranraer, for **Cruggleton Searchlight 236500**, red roan, born Aug. 19; s. Lutwyche Gaffer 209357, d. 99687 Secret Stella by Bridgebank Paymaster 154308.
580 **III. (£5).**—ALEXANDER & ADDIE, Newbiggin, Cambus, Stirling, for **Cambus Keystone 235707**, white, born Oct. 3; s. Collynie Royal Leader 188656, d. Lavender Colleen by Red Viscount 138829.
585 **IV. (£4).**—A. J. MARSHALL, for **Cruggleton Accolade 236363**, red and little white, born Aug. 10; s. Collynie Baron Excellence 222202, d. 39682 Augusta Feodore by Balcairn Baronet 153566.
587 **R. N.—A. J. MARSHALL, for Cruggleton Bull's Eye.**

Class 81.—*Shorthorn Bulls, born on or between January 1 and March 31, 1930.*⁵

- 598 **I. (£15).**—R. S. MCWILLIAM, Garguston, Muir of Ord, Ross-shire, for **Garguston Golden Storm**, white, born March 29; s. Calrossie Eldorado 228722, d. 64651 Golden Fanny by Naemoor Cock Robin 157946.
594 **II. (£10).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for **Pendley Philosopher**, red and little white, born Jan. 27; s. Millhills Rosicrucian 224992, d. 88334 Cudham Broadhooks 29th by Collynie Golden Key 170455.
597 **III. (£5).**—WILLIAM GARNE, Aldsworth, Cheltenham, for **Aldsworth Socrates**, red, born Jan. 26; s. Aldie Gaffer 227624, d. 98957 Aldsworth Secret 9th by Lutton Hussar 208949.
603 **IV. (£4).**—CAPT. R. G. M. WILSON, The End House, Lady Margaret Road, Cambridge, for **Stonelands Marmon**, white, born Jan. 8, bred by N. N. Lee, Stonelands, Arneliffe, Skipton-in-Craven; s. Collynie Red Eagle 214703, d. 47233 Orange Blossom 67th by Collynie Hero 170456.
602 **V. (£3).**—LADY NELLIE JEAN WILLS, Langford Court Farm, Langford, Bristol, for **Rickford Golden Sun**, red, born Jan. 30, bred by Sir G. Vernon P. Wills, Bart., Langford Court Farm; s. Calrossie Butterfly Monarch 228718, d. 103849 Rickford Golden Lady by Cudham Prospect 206506.
601 **E. N.—A. J. MARSHALL, Bridgebank, Stranraer, for Nethercoullie Sheriff.**
H. G.—591.

Class 82.—*Shorthorn Bulls, born on or between April 1 and June 30, 1930.*

- 604 **I. (£15).**—HIS MAJESTY THE KING, The Royal Farms, Windsor, for **Windsor Royal Leader**, dark roan, born April 16; s. Collynie Royal Leader 188656, d. 94996 Cluny Lady Eliza 6th by Brawith Chieftain 187661.
615 **II. (£10).**—WILLIAM W. FRANK, Walshford, Wetherby, for **Walshford Paymaster**, dark roan, born April 12; s. Kinellar Juggler 224170, d. 66570 Ebor Blythsome by Cudham Viscount 179943.
618 **III. (£5).**—WILLIAM GARNE, Aldsworth, Cheltenham, for **Haselor Nonsuch**, red, born April 8, bred by George Swift, Haselor, Evesham; s. Sanghar Count Lavender 233363, d. 95471 Rushcourt Nonpareil 4th by Cluny Beauty Chief 206245.
610 **IV. (£4).**—J. BAIRD & CO. (FALKIRK), LTD., Bantaskin, Falkirk, for **Bantaskin Roan Prince**, dark roan, born April 14; s. White Prince 168014, d. 15554 Cudham Augusta 4th by Golden Charm 188750.
606 **V. (£3).**—ALEXANDER & ADDIE, Newbiggin, Cambus, Stirling, for **Cambus Laureate**, red, born June 1; s. Cambus Inca 228753, d. 45060 Cambus Butterfly by Garbity Field Marshal 142541.
605 **R. N.—ALEXANDER & ADDIE, for Cambus Laird.**
H. G.—608. G.—607.

Class 83.—*Shorthorn Bulls, born on or between July 1 and December 31, 1930.*⁴

- 631 **I. (£15).**—LADY NELLIE JEAN WILLS, Langford Court Farm, Langford, Bristol, for **Rickford Bullion**, red, born Aug. 16, bred by Sir G. Vernon P. Wills, Bart., Langford Court Farm; s. Calrossie Butterfly Monarch 228718, d. 114606 Rickford Ruby 4th by Cudham Prospect 206506.

¹ Special Prizes of £15 First Prize and £10 Second Prize given by the Shorthorn Society for the best groups of three animals bred by Exhibitor.

² Champion Prize of £20 given by the Shorthorn Society for the best Bull. A Silver Medal was given by the Shorthorn Society to the Breeder of the Champion Bull.

³ Silver Challenge Cup given by the Argentine Shorthorn Breeders' Association for the best Bull.

⁴ The "Brothers Colling" Memorial Perpetual Challenge Cup presented through the Durham Agricultural Committee for the best Shorthorn.

⁵ Prizes, except Fourth and Fifth, given by the Shorthorn Society.

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- 627 **II. (#10).**—A. J. MARSHALL, Bridgebank, Stranraer, for *Cruggleton Prideaux*, red roan, born Aug. 14; s. Bridgebank Rosedene 213883, d. 89745 Princess Ruthina by Duke of Richmond 148551.
- 626 **III. (#5).**—FANNY LADY LEON, Bletchley Park, Bletchley, for *Bletchley Justice*, roan, born Aug. 10; s. Balcairn Royal Pride 220720, d. Jessica by Edgcote White Eagle 115284.
- 624 **IV. (#4).**—CHIVERS & SONS, LTD., Histon, Cambridge, for *Chippinghurst Prince Edwin*, dark roan, born Aug. 6, bred by Alfred Wheeler, Chippinghurst Manor, Cuddesdon, Oxford; s. Golden Edwin 230502, d. 114290 Chippinghurst Princess Royal 2nd by Denton Triumph 197995.
- 622 **R. N.**—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for *Swinton Nabob*.

Class 84.—*Shorthorn Cows, in-milk, born in or before 1927.*

- 634 **I. (#15).**—A. J. MARSHALL, Bridgebank, Stranraer, for 99820 *Jealous Betsy*, roan, born June 21, 1927, calved April 16, 1931; s. Lutwyche Grafter 209357, d. 64793 *Jealous Betty* by Bridgebank Paymaster 154308.
- 632 **II. (#10).**—R. S. MOWILLIAM, Garguston, Muir of Ord, Ross-shire, for 51229 *Lady Broadhooks*, roan, born April 2, 1923, calved Nov. 2, 1930, bred by T. Kirk, Abbey Mains, Haddington; s. Stonetown Challenger 159672, d. Twin Broadhooks 2nd by Sanquhar Knight Marshal 133424.

Class 85.—*Shorthorn Heifers, in-milk, born in 1928.*

- 635 **I. (#15).**—ALEXANDER & ADDIE, Newbiggin, Cambus, Stirling, for 104299 *Cambus Orange Blossom* 2nd, dark roan, born May 7, calved Dec. 22, 1930; s. Balmuchy Baronet 213217, d. 15576 *Cudham Orange Blossom* 7th by Cluny Sir Augustus 141658.
- 636 **II. (#10).**—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for 104836 *Swinton Rosebud* 2nd, roan, born Aug. 12, calved Jan. 3, 1931; s. Swinton Regent 185667, d. 27399 *Rosie Rosewood* by Gainford Prince Royal 142527.
- 642 **III. (#5).**—JOHN R. UPSON, Rush Court, Wallingford, for 114207 *Collynie Royal Princess* 3rd, roan, born Jan. 15, calved Dec. 25, 1930, bred by J. Duthie Webster, Tarves, Aberdeenshire; s. Quetta 218891, d. 81071 *Collynie Princess* 45th by *Collynie Royal Leader* 188656.
- 638 **R. N.**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 111056 *Basildon Orange Blossom* 3rd.

Class 86.—*Shorthorn Heifers, born in 1929.*

- 654 **I. (#15, & Champion).¹**—BAPTON SHORTHORN CO., LTD., Bapton, Mace Farm, Cudham, Sevenoaks, for 116724 *Bapton Orange Blossom* 3rd, roan, born Jan. 8, bred by Sir Cecil Chubb, Bart., Bapton Manor, Godford, Wilts.; s. Roan Robin 202241, d. 52127 *Cudham Orange Blossom* by Cudham Golden Star 170756.
- 647 **II. (#10).**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for 124454 *Collynie Augusta Belle*, roan, born March 8, bred by J. Duthie Webster, Tarves, Aberdeenshire; s. Balcairn Beaver 195853, d. 39555 *Cudham Augusta* 9th by Cluny Proud Orangeman 154878.
- 649 **III. (#5).**—ARTHUR GREEN, Highfield, Denton, Ilkley, Yorks, for 118600 *Denton Crystal*, roan, born June 24; s. Staff Officer 226629, d. 49293 *Denton Broadhooks* by *Collynie Golden Key* 170455.
- 650 **R. N.**—FANNY LADY LEON, Bletchley Park, Bletchley, for *Bertha*.
H. C.—646.

Class 87.—*Shorthorn Heifers, born on or between January 1 and March 31, 1930.*

- 656 **I. (#15, & E. N. for Champion).¹**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for *Rosewood Countess*, roan, born Jan. 20, bred by J. Durno, Uppermill, Aberdeen; s. Millhills Broad Arrow 209677, d. 84836 *Rosewood Princess* 2nd by Millhills Clarion 174123.
- 653 **II. (#10).**—FRED ALLISON, Lilac Farm, Yedingham, Malton, for *Yedingham Mina* 8th, born Jan. 17; s. Allerston Royal Warrior 204403, d. 93419 *Yedingham Mina* 5th by *Yedingham Vulcan* 212743.
- 652 **III. (#5).**—ALEXANDER & ADDIE, Newbiggin, Cambus, Stirling, for *Cambus Butterfly* 8th, roan, born Jan. 15; s. *Collynie Red King* 214704, d. 57617 *Cambus Butterfly* 2nd by Garbity Field Marshal 142541.
- 658 **IV. (#4).**—A. J. MARSHALL, Bridgebank, Stranraer, for *Gracie Clipper*, roan, born Feb. 19; s. Lutwyche Challenger 191796, d. 79953 *Templebreagh Clipper Triplex* by Garbity Lifeguard 131127.
- 654 **E. N.**—MAJOR CLIVE BEHRENS, Swinton Grange, Malton, for *Swinton Maid Ramsden* 15th.
H. C.—655. C.—657.

Class 88.—*Shorthorn Heifers, born on or between April 1 and December 31, 1930.*

- 661 **I. (#15).**—ALEXANDER & ADDIE, Newbiggin, Cambus, Stirling, for *Cambus Lady Broadhooks*, red, born April 1; s. *Cambus Inca* 228753, d. 58689 *Lady Broadhooks* 3rd by *Abbeymains Combatant* 163245.

¹ Champion Prize of £20, given by the Shorthorn Society for the best Cow or Heifer. A Silver Medal was given by the Shorthorn Society to the Breeder of the Champion Cow or Heifer.

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- 663 II. (£10.)—J. BAIRD & Co. (FALKIRK), LTD., Bantaskin, Falkirk, for Bantaskin Crocus 8th, red roan, born May 13; s. Cambus Ingot 228757, d. 45424 Bantaskin Crocus by Naemoor Druid 165542.
- 666 III. (£5.)—H. & F. B. HIRSH, Low Hall, Daere, via Harrogate, for Daere Clipper Maiden 7th, red, born May 24; s. Collynie Red Eagle 214703, d. 74837 Daere Clipper Maiden 2nd by Cluny Primrose Star 188578.
- 667 IV. (£4.)—A. J. MARSHALL, Bridgebank, Stranraer, for Braw Wimple, dark roan, born June 24; s. Lutwyche Challenger 191796, d. 76882 Velled Wimple by Bridgebank Curtis 187722.
- 665 R. N.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Augusta Princess 10th.
H. C.—664. C.—662.

Herefords.

Class 89.—Hereford Bulls, born on or before August 31, 1928.

- 672 I. (£15, Champion,¹ & Champion.²)—PERCY E. BRADSTOCK, Free Town, Tarrington, Herefordshire, for Free Town Admiral 49233, born Oct. 3, 1927; s. Crossways Saphire 44732, d. Heather by Time Test 26529.

Class 90.—Hereford Bulls, born on or between September 1, 1928, and August 31, 1929.

- 677 I. (£15, R. N. for Champion,¹ & R. N. for Champion.²)—ERNEST STEVENS, Chapel Farm, Elmley Castle, Pershore, for Pershore Layman 50927, born Sept. 12, 1928; s. Rose Showman 39935, d. Ladybird 5th by Eaton Columbus 36620.
- 679 II. (£10.)—EDWARD WEBB & SONS (STOURBRIDGE), LTD., Astwood Farm, Stoke Works, Bromsgrove, for Free Town Counsellor 50495, born Feb. 11, 1929, bred by P. E. Bradstock, Free Town, Tarrington; s. Gaines Albion 45982, d. Princess 3rd by Aldersend Napier 35844.
- 674 III. (£5.)—MRS. H. G. CLEGG, Wormington Grange, Broadway, Wores, for Egletton Sunshine 50421, born Jan. 25, 1929, bred by A. E. Hill, Egletton Court, Ledbury; s. Tomboy 48695, d. Brenda by Wickton Cardinal 46624.

Class 91.—Hereford Bulls, born on or between September 1 and November 30, 1929.³

- 683 I. (£15.)—VISCOUNTSSE HEREFORD, Hampton Court, Leominster, for Hampton Court Hero 51881, born Sept. 7; s. Free Town Vincent 44880, d. Gamester Field by Nicola 41328.
- 682 II. (£10.)—A. A. G. HANNAM, Ridge Farm, Chilmark, Salisbury, for Perton Miller, born Sept. 3, bred by H. J. Dent, Perton Court, Hereford; s. Gobion Emblem 2nd 48202, d. Melba 4th by Suncled 28762.
- 685 III. (£5.)—WILLIAM SMITH, The Leen, Pembridge, for Leen Gilderoy 52014, born Oct. 10; s. Perton Juggler 49658, d. Leen Girl by Free Town Warrior 40971.
- 681 R. N.—JOHN C. BROOKFIELD, Condover Grange, Shrewsbury, for Eytan Worthy.

Class 92.—Hereford Bulls, born on or between December 1, 1929, and February 28, 1930.

- 686 I. (£15, & Champion.⁴)—CAPT. ROUSE BOUGHTON, Downton Hall, Ludlow, for Saracen 52427, born Jan. 5, 1930, bred by Sir W. Rouse Boughton, Bart., Fishmore Hall, Ludlow; s. Samuel 39992, d. Glitter by Crossways Nancytute 44729.
- 692 II. (£10, & R. N. for Champion.⁴)—ERNEST STEVENS, Chapel Farm, Elmley Castle, Pershore, for Wickton President 2nd 52674, born Jan. 6, 1930, bred by F. J. Newman, Lower Wickton, Leominster; s. Crossways Emeraldute 44726, d. Pink Fanny by Patchwork 34099.
- 687 III. (£5.)—C. L. GODSON, Hill End, Weston Beggard, Hereford, for Hillend Resolute, born Dec. 25, 1929; s. Gobion Resolute 2nd 48210, d. Crossways Gamestress 4th by Resolute 35537.
- 688 R. N.—W. R. LYKE, Lawton Bury, Leominster, for Sir Sam of Lawton Bury.

Class 93.—Hereford Bulls, born on or after March 1, 1930.

- 693 I. (£15.)—HIS MAJESTY THE KING, The Royal Farms, Windsor, for Windsor Aristocrat 52679, born May 4; s. Free Town Valors 48171, d. Peggy by Lulsley Statesman 37327.
- 695 II. (£10.)—J. N. BITCHER, Tern, Wellington, Shropshire, for Tern Democrat 52550, born March 2; s. Burton Showman 46873, d. Russell Isis by Russell Gay Lad 45388.

¹ Champion Prize of £10 10s. given by the Hereford Herd Book Society for the best Senior Bull.

² Perpetual Silver Challenge Trophy given through the Hereford Herd Book Society for the best Bull.

³ Prizes given by the Hereford Herd Book Society.

⁴ Champion Prize of £10 10s. given by the Hereford Herd Book Society for the best Junior Bull.

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696 **III. (£5).**—E. CRAIG TANNER, Eyton-on-Severn, Wroxeter, Shropshire, for *Eyton What's Wanted*, born March 10; s. *Prory Resolute* 41505, d. *Eyton Prunella* 13th by *Eyton Quaker* 45909.

Class 94.—Hereford Cows or Heifers, in-milk, born on or before August 31, 1928.

697 **I. (£15).**—HIS MAJESTY THE KING, The Royal Farms, Windsor, for *Blue Bird*, born April 5, 1923, calved Dec. 27, 1930; s. *Lulsley Statesman* 37327, d. *Blue Sky*, by Father Christmas 30557.

698 **II. (£10).**—CAPT. ROUSE BOUGHTON, Downton Hall, Ludlow, for *Kiwi*, born Dec. 30, 1923, calved March 11, 1931, bred by Sir W. Rouse Boughton, Bart., Fishmore Hall, Ludlow; s. *Samuel* 39992, d. *Kit* by *Broadway Excelsior* 30331.

Class 95.—Hereford Heifers, born on or between September 1, 1928, and August 31, 1929.

702 **I. (£15, & Champion.¹)**—R. S. DE Q. QUINCEY, The Vern, Bodenham, Hereford, for *Petunia Vern 2nd*, born Jan. 25, 1929; s. *Impressionist* 46038, d. *Petunia Vern* by *Bodenham Recourt* 43343.

703 **II. (£10).**—JOHN WALKER, Knightwick Manor, Worcester, for *Knightwick Flirt*, born Dec. 11, 1928; s. *Defence* 38981, d. *Oyster Pearl* by *Wickton Gipsy Chief* 40300.

699 **III. (£5).**—HIS MAJESTY THE KING, The Royal Farms, Windsor, for *Windsor Ellen*, born Sept. 24, 1928; s. *Aldersend Monarch* 38469, d. *Envy* by *Admiral Beatty* 31222.

Class 96.—Hereford Heifers, born on or between September 1 and November 30, 1929.²

711 **I. (£15).**—EDWARD WEBB & SONS (STOURBRIDGE), LTD., Astwood Farm, Stoke Works, Bromsgrove, for *Astwood Ladyday*, born Oct. 24; s. *Astwood Printer* 48881, d. *Astwood Ladybird* by *Conway* 32398.

709 **II. (£10).**—JAMES MEDLICOTT, Bodenham Court, Hereford, for *Sunray 2nd*, born Sept. 26; s. *Bodenham Barrister* 45668, d. *Garland* by *Primate* 39833.

706 **III. (£5).**—JOHN C. BROOKFIELD, Condover Grange, Shrewsbury, for *Condover Begonia 5th*, born Sept. 24; s. *Prory Resolute* 41505, d. *Condover Begonia* by *Orlando* of *Pitsford* 42697.

707 **R. N.**—VISCOUNTESS HEREFORD, Hampton Court, Leominster, for *Hampton Court Gay Lass*.
H.C.—708, 710.

Class 97.—Hereford Heifers, born on or after December 1, 1929.

715 **I. (£15, & R. N. for Champion.³)**—H. B. GRIFFITHS, Little Tarrington, Hereford, for *Dewberry*, born Jan. 12, 1930; s. *Free Town Director* 49237, d. *Daybreak* by *Aldersend Conqueror* 38464.

712 **II. (£10).**—HIS MAJESTY THE KING, The Royal Farms, Windsor, for *Windsor Blue Light*, born Feb. 18, 1930; s. *Free Town Valors* 218171, d. *Blue Bell* by *Walterston Sam* 38309.

717 **III. (£5).**—JAMES MEDLICOTT, Bodenham Court, Hereford, for *Maggie*, born Dec. 4, 1929, bred by R. Medlicott, Hampton Park House, Stoke Prior; s. *Bodenham Emery* 43341, d. *Marjorie* by *Defiance* 36526.

Devons.

Class 98.—Devon Bulls, born in or before 1929.

718 **I. (£15, & Champion.¹)**—B. W. BEER, Langley Barton, Umberleigh, Devon, for *Admiral Stukeey* 14706, born March 2, 1929, bred by J. C. Thomas, Bartridge, Umberleigh; s. *Court Bride* 13071, d. *Jellicoe's Stuckey 5th* 30243 by *Nowers Jellicoe* 9011.

720 **II. (£10).**—ABRAHAM TRIBLE & SONS, Halsdon, Holsworthy, Devon, for *Clampit Gold Mine 2nd* 13980, born Feb. 1, 1927, bred by Cecil Brent, Clampit, Callington, Cornwall; s. *Pound Bomper* 12418, d. *Clampit Gay Lass 20th* 34698 by *Highfield Gem* 8919.

Class 99.—Devon Bulls, born in 1930.

724 **I. (£15, & R. N. for Champion.²)**—CECIL BRENT, Clampit, Callington, Cornwall, for *Clampit Goldmine 3rd* 15212, born Jan. 31; s. *Pound Bomper* 12418, d. *Clampit Gay Lass 20th* 34698 by *Highfield Gem* 8919.

723 **II. (£10).**—G. C. ALEXANDER, Winterbourne Stoke, Salisbury, for *Stoke Friar* 15495, born Jan. 26; s. *Stoke Glory* 13760, d. *Stoke Bratton 2nd* 37667 by *Cutsey Larkspur* 11827.

¹ Champion Prize of £10 10s. given by the Hereford Herd Book Society for the best Cow or Heifer.

² Prizes given by the Hereford Herd Book Society.

³ Champion Prize of £10 10s. given by the Devon Cattle Breeders' Society for the best Bull.

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- 726 **III. (£5).**—H. C. HANCOCK, The Court, Milverton, for Court Viol, born Aug. 7; s. Avercombe What's Wanted 12124, d. Violet 2nd 36394 by Kytton Prince 10648.
721 **R. N.**—G. C. ALEXANDER, for Stoke Don.

Class 100.—Devon Cows or Heifers, in-milk, born in or before 1928.

- 727 **I. (£15, & Champion.¹)**—CECIL BRENT, Clampt, Callington, Cornwall, for Clampt Dainty 10th 41040, born March 31, 1928, calved Jan. 24, 1931; s. Pound Romper 12413, d. Clampt Dainty 7th 37749 by Highfield Gem 8919.
729 **II. (£10, & R. N. for Champion.²)**—NATHANIEL HEARD & SON, Home Farm, Werrington, Launceston, for Milltown Pride 40405, born May 6, 1926, calved Feb. 9, 1931; s. Wellesley Prince 12488, d. Tulip 5th 37002 by Woodlands King 11299.
728 **III. (£5).**—H. H. BROADMEAD, Enmore Castle, Bridgwater, for Avercombe Gladys 38671, born May 1, 1925, calved May 14, 1931, bred by F. W. Verney, Avercombe, Bishop's Nympton; s. Avercombe Whacker 12122, d. Avercombe Molly 32433 by Cutsey Blender 9633.

Class 101.—Devon Heifers, born in 1929.

- 731 **I. (£15).**—CECIL BRENT, Clampt, Callington, Cornwall, for Clampt Snowdrop 4th 42027, born July 12; s. Highfield Gem 8919, d. Hendra Snowdrop 7th 37187 by Avercombe What's Wanted 12124.
736 **II. (£10).**—ABRAHAM TRIBLE & SONS, Halsdon, Holsworthy, for Kingsford Fancy Lady 42780, born Feb. 4; s. Overton Gold Coin 2nd 10236, d. Fancy 18th of Halsdon 37521 by Crazelawman Rustic 9628.
733 **III. (£5).**—H. C. HANCOCK, The Court, Milverton, for Court Blushing 42296, born April 18; s. Bickley Ambassador 12135, d. Court Bride 3rd 39302 by Holcombe Mainstay 11533.
730 **R. N.**—G. C. ALEXANDER, Winterbourne Stoke, Salisbury, for Stoke Julia.
H. C.—732.

Class 102.—Devon Heifers, born in 1930.

- 739 **I. (£15).**—H. H. BROADMEAD, Enmore Castle, Bridgwater, for Enmore New Moon 43003, born Jan. 1; s. Werrington Lord 13831, d. Avercombe Moonstone 37683 by Overton Masterpiece 11152.
746 **II. (£10).**—CLIFFORD THORNE, Rutland Villa, Maindee, Newport, Mon., for Clampt Hygiene 18th, born March 16, bred by Cecil Brent, Clampt, Callington, Cornwall; s. Highfield Gem 8919, d. Clampt Hygiene 10th 38902 by Pound Romper 12413.
744 **III. (£5).**—J. C. H. THOMAS, Bartridge, Umlerleigh, Devon, for Bartridge Alice 43763, born April 2; s. Carey Sport 18917, d. Highfield Alice 5th 38361 by Clampt Dreadnought 11797.
740 **IV. (£4).**—R. GYNN & SON, Treslay, Boscastle, Cornwall, for Treslay Someday 43294, born Jan. 6; s. Netherex Good Sort 13693, d. Coombeshead Daisy 1st 28033 by Lord Daws 12th 7180.
742 **R. N.**—NATHANIEL HEARD & SON, The Home Farm, Werrington, Launceston, for Milltown Pride 2nd.

Sussex.

Class 103.—Sussex Bulls, born in or before 1929.

- 747 **I. (£15, Champion.³ Champion.² & R. N. for Champion.⁴)**—EDWARD HURTLEY, Crowborough Warren, Sussex, for Crowborough Warren Marksman 6th 7200, born March 14, 1929; s. Bolebroke Marksman 14th 6827, d. Oakover Daisy 25th 23272 by Oakover Chevalier 6th 5610.
752 **II. (£10, R. N. for Champion.² & R. N. for Champion.³)**—LIEUT.-COL. J. R. WARREN, O.B.E., M.C., The Hyde, Handcross, Haywards Heath, for Handcross Harlequin 7303, born Feb. 4, 1929; s. Tiehurst King Twin 2nd 6751, d. Lock Knelle 2nd 23244 by Bolebroke Harlequin 3rd 6247.
749 **III. (£5).**—L. O. JOHNSON, Peppers, Ashurst, Steyning, for Kings Barn Twin 7213, born Aug. 30, 1929; s. Petworth Toreador 16th 6802, d. Oakover Twin 20th 22942 by Oakover Lad 18th 5819.
750 **R. N.**—LORD LEONFIELD, Petworth House, Sussex, for Petworth Toreador 36th.

Class 104.—Sussex Bulls, born in 1930.

- 754 **I. (£15).**—LIEUT.-COL. J. R. WARREN, O.B.E., M.C., The Hyde, Handcross, Haywards Heath, for Bolebroke Rover 1st 7411, born April 7, bred by F. R. Mann, Bolebroke, Hartfield Sussex; s. Crowborough Warren Rover 8th 6998, d. Lock Darkey 28th 18388 by Birling Geoffrey 2nd 4252.

¹ Champion Prize of £10 10s. given by the Devon Cattle Breeders' Society for the best Cow or Heifer.

² Champion Silver Medal given by the Sussex Herd Book Society for the best Bull.

³ Perpetual Silver Challenge Trophy given through the Sussex Herd Book Society for the best Bull.

⁴ Perpetual Silver Challenge Cup given by the Sussex Cattle Breeders' Society of South Africa for the best Sussex.

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- 753 II. (£10).—LORD LECONFIELD, Petworth House, Sussex, for *Petworth Delight* 3rd 7384, born Jan. 27; s. *Red Delight* 4917, d. *Petworth Daisy* 2nd 23451 by *Lock Toreador* 2nd 5924.

Class 105.—Sussex Cows or Heifers, in-milk, born in or before 1928.

- 760 I. (£15, *Champion*,¹ & *Champion*.²)—LIEUT.-COL. J. R. WARREN, O.B.E., M.C., The Hyde, Handcross, Haywards Heath, for *Lock Knelle* 2nd 23244, born March 16, 1926, calved May 8, 1931, bred by E. Ezra, Lock, Partridge Green, Sussex; s. *Bolebrooke Harlequin* 3rd 6247, d. *Marlands Lady Knelle* 20113 by *Jacobite* 5116.
- 756 II. (£10).—BRIG.-GEN. G. HOLDSWORTH, C.B., C.M.G., Glynde Place, Sussex, for *Caburn Gentle* 3rd 24672, born Feb. 27, 1928, calved Jan. 18, 1931; s. *Caburn Diploma* 6370, d. *Brooker Gentle* 20303 by *Bolebrooke Peaceful Mariner* 5039.
- 757 III. (£5).—EDWARD HURTLEY, Crowborough Warren, Sussex, for *Crowborough Warren Daisy* 1st 24681, born Jan. 21, 1928, calved Feb. 21, 1931; s. *Ripton Rover* 5th 6302, d. *Oakover Daisy* 15th 19561 by *Mabledon Lad* 4326.
- 758 R. N.—LORD LECONFIELD, Petworth House, Sussex, for *Petworth Knot* 8th.

Class 106.—Sussex Heifers, born in 1929.

- 764 I. (£15, & R. N. for *Champion*.²)—LIEUT.-COL. J. R. WARREN, O.B.E., M.C., The Hyde, Handcross, Haywards Heath, for *Wickham Court Beauty* 113th 25271, born Jan. 17, bred by E. & B. Kelsey, Wickham Court, Canterbury; s. *Ripton Rover* 4554, d. *Wickham Court Beauty* 70th 21432 by *Ripton Major* 3rd 4278.
- 761 II. (£10).—COL. SIR G. L. COUTHROP, BART., M.C., M.P., Whiligh, Wadhurst, Sussex, for *Whiligh Curly* 32nd 25052, born April 3; s. *Ticehurst King Twin* 6557, d. *Whiligh Curly* 15th 21844 by *Normanhurst Albert* 4864.
- 762 III. (£5).—BRIG.-GEN. G. HOLDSWORTH, C.B., C.M.G., Glynde Place, Sussex, for *Caburn Beauty* 8th 25211, born Jan. 11; s. *Caburn Diploma* 6370, d. *Caburn Gladeye* 20747 by *Wadden Luck* 4891.
- 763 R. N.—LORD LECONFIELD, Petworth House, Sussex, for *Petworth Daisy* 3rd.

Class 107.—Sussex Heifers, born in 1930.

- 767 I. (£15).—EDWARD HURTLEY, Crowborough Warren, Sussex, for *Crowborough Warren Princess* 1st 25692 born Jan. 24; s. *Otham Pilgrim* 6521, d. *Tilsden Princess* 24th 24332 by *Prince Bill* of *Lyne* 6322.
- 772 II. (£10).—LIEUT.-COL. J. R. WARREN, O.B.E., M.C., The Hyde, Handcross, Haywards Heath, for *Handcross Daisy* 8th 25917, born Jan. 18; s. *Jacques Court G* 26708, d. *Handcross Daisy* 1st 22389 by *Oakover Lad* 10th 5340.
- 769 III. (£5).—L. O. JOHNSON, Peppers, Ashurst, Steyning, for *King's Barn Headless* 3rd 25719, born Jan. 2; s. *Petworth Toreador* 16th 6802, d. *King's Barn Headless* 23411 by *North Chapel Commander* 5853.
- 766 R. N.—BRIG.-GEN. G. HOLDSWORTH, C.B., C.M.G., Glynde Place, Sussex, for *Caburn Beauty* 12th.

Welsh.

Class 108.—Welsh Bulls, born on or before November 30, 1929.

- 774 I. (£15, & *Champion*.³)—SIR J. CROSLAND GRAHAM, Clwyd Hall, Ruthin, North Wales, for *Pilsdon Baldwin* 2921, born Aug. 13, 1924, bred by S. H. Jenks, Pilsdon Manor, Bridport; s. *Ty Croes Llewellyn* 2376, d. *Penrhos Branwen* 4640 by *Nipper* of *Penrhyn* 1131.
- 776 II. (£10, & R. N. for *Champion*.³)—MRS. WILLIAMS-OWEN, Trevellyr, Bodorgan, Anglesey, for *Trevellyr Coron* 3237, born Dec. 18, 1924; s. *Fennynydd Iolo* 2324, d. *Corwen Maggie* 4356 by *Bodrida Lion* 1209.
- 773 III. (£5).—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry, for *Egryn Gynedryn* 3908, born Jan. 24, 1929, bred by Moses Griffiths, Egryn, Dyffryn, North Wales; s. *Townyn Arwr* 9238, d. *Escuan Cadi* 4914 by *Escuan Nero* 1837.
- 776, 786, 796 Special £15.—MRS. WILLIAMS-OWEN, for *Trevellyr Coron*, *Trevellyr Diamond* and *Trevellyr Holly*.
- 774, 782, 793 Special £10.—SIR J. CROSLAND GRAHAM, for *Pilsdon Baldwin*, *Dellish* of *Nant-clwyd* and *Graemes Mab*.

Class 109.—Welsh Bulls, born on or between December 1, 1929 and November 30, 1930.

- 777 I. (£15).—MISSES DILLON & CORBETT, Spelsbury, Charlbury, Oxon, for *Plynlimon Dairyman*, born July 3, 1930, bred by Capt. Bennett Evans, Bow Street, Cardiganshire; s. *Caradoc* of *Glasgoed* 2436, d. *Plynlimon Heather Belle* 8128 by *Glynllivon Bob* 1968.

¹ Perpetual Silver Challenge Cup given by the Sussex Cattle Breeders' Society of South Africa for the best Sussex.

² Champion Silver Medal given by the Sussex Herd Book Society for the best Cow or Heifer.

³ Champion Silver Medal given by the Welsh Black Cattle Society for the best Bull.

⁴ Special Prizes of £15 (First Prize) and £10 (Second Prize) given by the Welsh Black Cattle Society for the best groups of one Bull and two Cows or Heifers.

Class 110.—Welsh Cows or Heifers, in-milk, born on or before November 30, 1928.

- 786 I. (£15, & R. N. for Champion.¹)—MRS. WILLIAMS-OWEN, Trevellyr, Bodorgan, Anglesey, for Trevellyr Diamond 9473, born Dec. 29, 1925, calved Jan. 16, 1931; s. Penmynydd Iolo 2324, d. Trevellyr Ruby 5564 by Bodelwa Volunteer 1273.
- 785 II. (£10.)—MRS. WILLIAMS-OWEN, for Penmynydd Cadi 9262, born April 1, 1926, calved Sept. 14, 1930, bred by William Owen, Penmynydd, Valley, Anglesey; s. Owain Glyndwr 2046, d. Penmynydd Beti 5285 by Bodrida Lion 1209.
- 782 III. (£5.)—SIR J. CROSLAND GRAHAM, Clwyd Hall, Ruthin, for Delilah of Nantolwyd 9188, born Oct. 28, 1926, calved April 1, 1931, bred by Sir E. Naylor Leyland, Bart., Nantolwyd Hall, Ruthin; s. Pilsdon Boxer 2617, d. Pilsdon Bute Min Arfon 3174 by Stanley 954.
- 780 R. N.—THE MISSES DILLON AND CORBETT, Spelsbury, Charlbury, Oxon, for Spelsbury Judith.

Class 111.—Welsh Heifers, born on or between December 1, 1928 and November 30, 1929.

- 787 I. (£15, & Champion.¹)—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry, for Glyn Tern 10526, born April 18, 1929; s. Caradoc 3rd of Plynlimon 3298, d. Glyn Kittewake 4116 by Madryn Joffre 1147.
- 792 II. (£10.)—MRS. WILLIAMS-OWEN, Trevellyr, Bodorgan, Anglesey, for Trevellyr Hyscinth 10947, born Jan. 28, 1929; s. Trevellyr Falcon 3656, d. Trevellyr Ruby 5564 by Bodelwa Volunteer 1273.
- 791 III. (£5.)—MRS. WILLIAMS-OWEN, for Trevellyr Hera 10945, born Jan. 18, 1929; s. Trevellyr Falcon 3656, d. Trevellyr Bragwaine 8043 by Ty Croes Volunteer 2129.
- 790 R. N.—MAJOR-GEN. LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny, for Llanover Florence.

Class 112.—Welsh Heifers, born on or between December 1, 1929 and November 30, 1930.

- 796 I. (£15.)—MRS. WILLIAMS-OWEN, Trevellyr, Bodorgan, Anglesey, for Trevellyr Holly, born Dec. 15, 1929; s. Trevellyr Coron 3237, d. Trevellyr Bronwen 8039 by Bodelwa Jester 1574.
- 794 II. (£10.)—MAJOR-GEN. LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny, for Llanover Floss, born Dec. 7, 1929; s. Trevellyr Edeyrn 3457, d. Mair Maything 6413 by Owain Gwynedd 1309.
- 795 III. (£5.)—MAJOR-GEN. LORD TREOWEN, C.B., C.M.G., for Llanover Godetia, born Jan. 1, 1930; s. Trevellyr Edeyrn 3457, d. Dean Pansy 6419 by Glyn Boy 1351.
- 793 R. N.—SIR J. CROSLAND GRAHAM, Clwyd Hall, Ruthin, for Graemes Mab.

Longhorns.**Class 113.—Longhorn Bulls, born in or before 1928.**

- 800 I. (£15, & Champion.²)—R. S. WALTERS, Norfolk Lodge, Sutton Coldfield, Warwickshire, for Arden Final 891, red, brindle and white, born April 15, 1925, bred by W. H. Sale, Arden Hill, Atherstone; s. Arden Warrior 806, d. Arden Fashion by Arden Dictator 782.
- 797 II. (£10, & R. N. for Champion.³)—FRED BILLING, Whoberley Hall, Coventry, for Sutton Rufus 930, red, brindle and little white, born June 15, 1927, bred by R. S. Walters, Norfolk Lodge, Sutton Coldfield; s. Chippinghurst Chief 861, d. Lady Violet of Kent by Admiral 832.
- 798 III. (£5.)—LORD DOVERDALE, Westwood Park, Droitwich, for Sutton Woodman 940, red, brindle and white, born June 7, 1928, bred by R. S. Walters, Norfolk Lodge, Sutton Coldfield; s. Arden Final 891, d. Arden Woodbine by Arden Warrior 806.
- 798, 806, 807 Special £10.⁴—LORD DOVERDALE, for Sutton Woodman, Westwood Gem and Westwood Valencia.
- 800, 813, 814 Special £5.⁵—R. S. WALTERS, for Arden Final, Lady Dido 2nd and Sutton Violet.
- 801, 819, 820 Special £4.⁶—H. H. METTERS, for Stoneleigh Select, Arabella of Stoneleigh and Pride of Stoneleigh.
- 804, 822, 823 R. N. for Specials.⁷—J. W. SWINNERTON-WESTON, for Westwood Woodman, Whitacre Sunrise 2nd and Whitacre Lupton 4th.

Class 114.—Longhorn Bulls, born in 1929 or 1930.

- 801 I. (£15.)—H. H. METTERS, Manor House, Stoneleigh, Coventry, for Stoneleigh Select 945, red and white, born Aug. 5, 1929; s. Whitacre Select 936, d. Angelina Dishley by Stivichall Cure 2nd 880.

¹ Champion Silver Medal given by the Welsh Black Cattle Society for the best Cow or Heifer.

² Perpetual Silver Challenge Cup given by the Longhorn Cattle Society for the best Senior Longhorn.

³ Special Prizes of £10 (First Prize), £6 (Second Prize) and £4 (Third Prize) given by the Longhorn Cattle Society for the best groups of one Bull and two Cows or Heifers.

- 803 II. (#10).—W. E. SWINNERTON, Crickley Barrow House, Northleach, Cheltenham, for *Crickley Nobleman*, red, brindle and white, born April 1, 1930; s. Waddon Duke 950, d. Chestnut of Chippinghurst by Park Royal 777.
- 802 III. (#5).—W. E. SWINNERTON, for *Crickley Lord*, red and white, born April 22, 1930; s. Waddon Duke 950, d. Carnation of Chippinghurst by Prince Diadem of Kent 778.
- 804 R. N.—J. W. SWINNERTON-WESTON, Over Whitacre, Birmingham, for *Westwood Woodman*.

Class 115.—Longhorn Cows or Heifers, in-milk, born in or before 1928.

- 806 I. (#15).—LORD DOVERDALE, Westwood Park, Droitwich, for *Westwood Gem*, red, brindle and white, born June 28, 1924, calved June 2, 1931; s. Arbury Alexander 851, d. Putley Connie by Poles Czar 685.
- 807 II. (#10).—LORD DOVERDALE, for *Westwood Valencia*, dark brindle and white, born Jan. 8, 1926, calved June 4, 1931; s. Arbury Alexander 851, d. Angelina 19th by Stowe Empire 624.
- 813 III. (#5).—R. S. WALTERS, Norfolk Lodge, Sutton Coldfield, Warwickshire, for *Lady Dido 2nd*, red, brindle and white, born May 18, 1923, calved Sept. 22, 1930, bred by H. B. Parsons, Boughton Lees, Ashford, Kent; s. Earl of Kent 814, d. Lady Dido by Eastwell Examiner 734.
- 809 IV. (#4).—W. E. SWINNERTON, Crickley Barrow House, Northleach, Cheltenham, for *Friar Sprig 2nd*, red, brindle and white, born June 16, 1927, calved June 29, 1931, bred by F. J. Mayo, Friar Waddon, Weymouth; s. Friar Pop 902, d. Friar Sprig by Aston 725.
- 808 R. N.—R. R. HOLLOCK, Stivichall Grange, Coventry, for *Finham Princess 4th*.
H. C.—812. O.—810.

Class 116.—Longhorn Heifers, born in 1929 or 1930.

- 818 I. (#15, & Champion.¹).—R. R. HOLLOCK, Stivichall Grange, Coventry, for *Finham Princess 5th*, brindle and white, born Aug. 14, 1929; s. Sutton Rufus 930, d. Finham Princess 2nd by Stivichall Cure 2nd 880.
- 823 II. (#10, & R. N. for Champion.²).—J. W. SWINNERTON-WESTON, Over Whitacre, Birmingham, for *Whitacre Lupin 4th*, red, brindle and white, born May 25, 1929; s. Bentley Prodigal 916, d. Lupin of Chippinghurst by Chippinghurst Greatheart 812.
- 822 III. (#5).—J. W. SWINNERTON-WESTON, for *Whitacre Sunrise 2nd*, red, brindle and white, born June 6, 1929; s. Bentley Prodigal 916, d. Sunrise of Chippinghurst by Chippinghurst Cricket 811.
- 820 IV. (#4).—H. H. METTERS, Manor House, Stoneleigh, Coventry, for *Pride of Stoneleigh*, red and white, born Aug. 12, 1929; s. Sutton Rufus 930, d. Stoneleigh Helene by Arden Dairyman 890.
- 816 R. N.—LORD DOVERDALE, Westwood Park, Droitwich, for *Westwood Crystal*.
H. C.—819, 821.

Aberdeen-Angus.

Class 117.—Aberdeen-Angus Bulls, born on or before November 30, 1928.

- 826 I. (#15, R. N. for Champion.³ & R. N. for Champion.⁴).—VISCOUNT ALLENDALE, Bywell, Stocksfield-on-Tyne, for *Elurio of Nisbethill* 87008, born Jan. 11, 1923, bred by David P. Elliot, Nisbeth Hill, Duns; s. Prince Ballie 57842, d. Elusive of Nisbethill 69321 by Edgar of Harviestoun 43288.
- 830 II. (#10).—W. L. HORBURY, Ettington Park, Stratford-on-Avon, for *Viceroy of Willett* 58180, born March 15, 1924, bred by H. C. Venning, Taunton; s. Envoy of Candacraig 52463, d. Velvet of Bywell 61612 by Proud George 88595.
- 827 III. (#5).—COL. RAYMOND FENNELL, Wytham Estate, Oxford, for *Black Brutus of Llantwit* 68386, born Jan. 21, 1927, bred by F. H. Turnbull, Llantwit Major, Cardiff; s. Pranksome 53401, d. Black Bara 70963 by Evendale of Bleaton 43139.

Class 118.—Aberdeen-Angus Bulls, born on or between December 1, 1928 and November 30, 1929.

- 839 I. (#15, Champion.⁵ Champion.⁶ & Champion.⁷).—W. GILCHRIST MACBETH, Dunira, Comrie, Perthshire, for *Erman of Dunira* 70474, born March 6, 1929; s. Prince Benacus of Ballindalloch 62664, d. Erminever 2nd of Castle Craig 68081 by Proud Eric of Ablerour 44518.
- 841 II. (#10, & R. N. for Champion.⁸).—J. P. ROSS-TAYLOR, Mungoswells, Duns, Berwickshire, for *Mungos Grogalach* 71940, born Dec. 8, 1928; s. Patron of Bywell 55449, d. Graceful 6th of Craighed 78035 by Eclipse of Ballindalloch 43266.

¹ Perpetual Silver Challenge Cup given by the Longhorn Cattle Society for the best Junior Longhorn.

² Gold Medal given by the English Aberdeen-Angus Cattle Association for the best animal of the opposite sex to that of the animal awarded the Champion Gold Medal of the Aberdeen-Angus Cattle Society.

³ Perpetual Silver Challenge Trophy given through the Aberdeen-Angus Cattle Society for the best Bull.

⁴ Silver Medal given by the Argentine Aberdeen-Angus Association for the best animal bred by Exhibitor.

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843 III. (#5).—E. G. WHEELER-GALTON, Claverdon Leys, Warwick, for *Gumption of Claverdon* 70818, born April 14, 1929; s. *Theakston Sard* 65838, d. *Gentle of Claverdon* 70802 by Lord Allan of Claverdon 41902.

837 R. N.—J. J. CRIDLAN, Maisemore Park, Gloucester, for *Friedric 2nd of Maisemore*.

Class 119.—Aberdeen-Angus Bulls, born on or between December 1, 1929 and November 30, 1930.

844 I. (#15).—VISCOUNT ALLENDALE, Bywell, Stocksfield-on-Tyne, for *Victor of Bywell* 75727, born April 23, 1930; s. *Elurio of Nisbethill* 67008, d. *Viva of Apethorpe* 78088 by Black Jester 54062.

852 II. (#10).—J. P. ROSS-TAYLOR, Mungoswalls, Duns, Berwickshire, for *Elf of Dunira* 73508, born Feb. 5, 1930, bred by W. Gilchrist Macbeth, Dunira, Comrie; s. *Prince Benacus of Ballindalloch* 62664, d. *Evesca of Dunira* 79014 by *Escalad of Blean* 48058.

848 III. (#5).—SIR PRINCE PRINCE-SMITH, BART., Southburn House, Driffield, for *Barbary of Southburn* 72558, born Dec. 7, 1929; s. *Judas of Southburn* 67880, d. *Black Bara* 70968 by *Evendale of Blean* 48139.

847 IV. (#4).—COL. RAYMOND FFENNELL, Wytham Estate, Oxford, for *Wytham Black Boy*, born Jan. 11, 1930; s. *Black Brutus of Llantwit* 63386, d. *Witley Bracelet* 84309 by *Kodak of Gallowie* 48575.

855 R. N.—THE MARQUESS OF ZETLAND, G.C.S.I., G.C.I.E., Aske, Richmond, Yorks, for *Eros of Brunstane*.

Class 120.—Aberdeen-Angus Cows or Heifers, in-milk, born on or before November 30, 1928.

858 I. (#15).—COL. RAYMOND FFENNELL, Wytham Estate, Oxford, for *Maori Belle of Doonholm* 61395, born Jan. 30, 1926, calved May 17, 1931, bred by Col. Norman Kennedy, D.S.O., Doonholm, Ayr; s. *Genteel Eric* 2nd 57102, d. *Bog Myrtle* 74405 by *Prince Benoon of Ballindalloch* 51308.

856 II. (#10, & R. N. for Champion.)—E. KETH BROOKS, Coombe Farm, Thatcham, Berks, for *Miss Beringbrough* 86684, born Jan. 27, 1928, calved Jan. 1, 1931, bred by W. T. Elgey, Bell Farm, Beringbrough, York; s. *Geordie of Goodwood* 48285, d. *Betty Maria* 61855 by *Emperor of Harviestown* 39401.

862 III. (#5).—W. L. HOBBS, Uttington Park, Stratford-on-Avon, for *Rebecca of Llantwit* 85568, born Feb. 11, 1927, calved Feb. 2, 1931, bred by F. H. Turnbull, Llantwit Major, Cardiff; s. *Ethos of Morlich* 56885, d. *Rachel* 5th of *Castleraig* 70446 by *Everest of Blean* 45862.

866 IV. (#4).—EDWARD A. WIGAN, Conholt Park, Andover, for *Jujube 5th of Basildon* 84723, born Jan. 7, 1927, calved Dec. 25, 1930, bred by Major J. A. Morrison, Basildon, Reading; s. *Balear* 56064, d. *Jujube* 5th 59548 by *Elysee of Ballindalloch* 30611.

857 R. N.—DEBENHAM & TOBY, Bladen Farms, Brianspuddle, Dorchester, for *Ermine* 3rd of *Buthvan*.

Class 121.—Aberdeen-Angus Heifers, born on or between December 1, 1928 and November 30, 1929.

874 I. (#15, Champion, & Champion.)—LADY ROBINSON, Kirkington Hall, Newark, for *Matchless of Ampot* 92174, born Dec. 24, 1928, bred by Col. C. W. Sofer Whitburn, Ampot, Andover; s. *Proud Baladan of The Burn* 62756, d. *Meta of Apethorpe* 53824 by *Exquisite of Ballindalloch* 33202.

867 II. (#10, & R. N. for Champion.)—CAPT. F. B. ATKINSON, Home Farm, Gallowhill, Morpeth, for *Bona Maid of Banks* 89279, born Dec. 22, 1928, bred by James Beddie, Banks, Strichen, Aberdeenshire; s. *Grierson of Ballindalloch* 54969, d. *Beatrice of Pitfour* 78485 by *Evolever of Ballindalloch* 50518.

869 III. (#5).—J. J. CRIDLAN, Maisemore Park, Gloucester, for *Lady Surpassing* 92150, born Dec. 7, 1928, bred by E. G. Wheeler-Galton, Claverdon Leys, Warwick; s. *Black Erne of Blean* 56215, d. *Lady Surprise* 61888 by *Black Elm* 37286.

875 IV. (#4).—E. G. WHEELER-GALTON, Claverdon Leys, Warwick, for *Dolly Varden of Claverdon* 92140, born Dec. 31, 1928; s. *Elate of Ballindalloch* 54421, d. *Dowlap of Claverdon* 57409 by *Gabriel of Eshott* 24502.

876 R. N.—E. G. WHEELER-GALTON, for *Fyrie's Pride*.
H. G.—877. G.—871.

Class 122.—Aberdeen-Angus Heifers, born on or between December 1, 1929 and November 30, 1930.

889 I. (#15).—J. P. ROSS-TAYLOR, Mungoswalls, Duns, Berwickshire, for *Mungos Lady Betty* 94862, born Feb. 9, 1930; s. *Patron of Bywell* 55449, d. *Belinda of Mungoswalls* 77280 by *Evolever of Ballindalloch* 50517.

891 II. (#10).—E. G. WHEELER-GALTON, Claverdon Leys, Warwick, for *Queen Regent of Claverdon* 95385, born Dec. 23, 1929; s. *Black Erne of Blean* 56215, d. *Queen's Maid of Claverdon* 80095 by *Fimpo of Auchterarder* 53348.

* Silver Medal given by the English Aberdeen-Angus Cattle Association for the best animal bred in England or Wales.

* Champion Gold Medal given by the Aberdeen-Angus Cattle Society for the best animal.

- 887 III. (25).—LESLIE K. OSMOND, Beelsby Hall, Grimsby, for *Eleanor of Tomdow* 93486, born Feb. 19, 1930, bred by James Gordon, Tomdow, Knockando, Strathspey; s. Evalue of Ballindalloch 64549, d. Ellmora of Edzell 80360 by Erector of Candacraig 54599.
- 882 IV. (24).—COL. RAYMOND FENNELL, Wytham Estate, Oxford, for *Wytham Black Eliza*, born Dec. 25, 1929; s. Black Brutus of Llantwit 63386, d. Witley Eliza 84313 by Kodak of Gallovie 48575.
- 878 V. (23).—VISCOUNT ALLENDALE, Bywell, Stocksfield-on-Tyne, for *Black Maid of Bywell* 92438, born March 12, 1930; s. Erebus of Harviestoun 56780, d. Black Maisie of Bywell 73354 by Placeman of Bywell 48929.
- 879 R. N.—E. KETH BROOKS, Coombe Farm, Thatcham, Berks, for *Blackeyes of Thatcham*. H. C.—881. G.—880. Cup.—J. A. ROSS-TAYLOR. R. N. for Cup.—VISCOUNT ALLENDALE.

Belted Galloways.

Class 123.—Belted Galloway Bulls, born on or before November 30, 1929.

- 899 I. (215).—W. S. TELLEY, Drury Lane Farm, Redmarley, Glos, for *Shenley Aristocrat* 797B, born May 9, 1927, bred by R. C. Irving, Shenley Lodge, Ridge Hill, Barnet; s. Knockbrex Prince Imperial 109B (D), d. Shenley Index 854B by Mochrum Sir Robert of Craigeach 60B.
- 898 II. (216).—GEN. SIR IAN HAMILTON, 1, Hyde Park Gardens, London, W.2, for *Allington Concrete* 467B, born Jan. 17, 1924, bred by G. H. Woodman, Balsdean Manor, Rottingdean; s. Allington Hector 17B, d. Allington Primrose 125B.
- 896 III. (25).—SIR AUGUST CAYZER, BART., Gartmore House, Gartmore, Stirling, for *Gartmore Robin* 707B, born April 17, 1927; s. Mark Hector 56B, d. Nan of Auchengassel 27570 by Tramp of Auchengassel 13488.
- 894 R. N.—THE MARQUIS OF BUTE, K.T., Craigeach, Kirkcowan, for *Mochrum Majestic*.

Class 124.—Belted Galloway Bulls, born on or between December 1, 1929 and November 30, 1930.*

- 903 I. (215).—SIR AUGUST CAYZER, BART., Gartmore House, Gartmore, Stirling, for *Gartmore Nieldin* 967B, born Jan. 30, 1930; s. Glenzier Watermark 725B, d. Gartmore Dorothy 1st 826B by Mark Hector 56B.
- 904 II. (216).—GEN. SIR IAN HAMILTON, 1, Hyde Park Gardens, London, W.2, for *Lullenden Concrete* 983B, born Jan. 9, 1930; s. Allington Concrete 467B, d. Gartmore Pamela 3rd 1042B by Mark Hector 56B.
- 905 III. (25).—R. C. IRVING, Shenley Lodge, Ridge Hill, Barnet, for *Shenley Dundamit* 909B (D), born Jan. 17, 1930; s. Knockbrex Prince Imperial 109B (D), d. Knockbrex Dryad 968B by Knockbrex Prince Imperial 109B (D).
- 902 R. N.—THE MARQUIS OF BUTE, K.T., Craigeach, Kirkcowan, for *Mochrum Commander*.

Class 125.—Belted Galloway Cows or Heifers, in-milk, born on or before November 30, 1928.

- 909 I. (215, & R. N. for Champion).—SIR AUGUST CAYZER, BART., Gartmore House, Gartmore, Stirling, for *Gartmore Helen* 1st 1322B, born April 7, 1927, calved Jan. 10, 1931; s. Mark Hector 56B, d. Gartmore Helen by Tramp of Auchengassel 13488.
- 907 II. (216).—THE MARQUIS OF BUTE, K.T., Craigeach, Kirkcowan, for *Mochrum Confidence* of Craigeach 1420B, born Feb. 2, 1927, calved Feb. 6, 1931; s. Boreland Pharaoh 90B, d. Mochrum Emma of Craigeach 387B by Mochrum Royal Record 61B.
- 911 III. (25).—MISS B. V. WAUDBY-GRIFFIN, Bromesborough Court, Dymock, Glos, for *Knockbrex Edith* 1282B, born March 6, 1927, calved Feb. 23, 1931, bred by J. Douglas Brown, Corseyard, Kirkcudbright; s. Mindork Admiral 58B, d. Knockbrex Ada 386B by Knockbrex Viking 50B.
- 910 R. N.—GEN. SIR IAN HAMILTON, 1, Hyde Park Gardens, London, W.2, for *Lullenden Janet*.

Class 126.—Belted Galloway Heifers, born on or between December 1, 1928 and November 30, 1929.

- 915 I. (215, & Champion).—SIR AUGUST CAYZER, BART., Gartmore House, Gartmore, Stirling, for *Gartmore Margaret* 1st 1850B, born Jan. 14, 1929; s. Gartmore Admiral 2nd 85B, d. Gartmore Grace 2nd 828B by Mark Hector 56B.
- 917 II. (216).—R. C. IRVING, Shenley Lodge, Ridge Hill, Barnet, for *Shenley Cayrice* 1954B, born July 5, 1929; s. Knockbrex Prince Imperial 109B (D), d. Shenley This 1158B.

* Silver Challenge Cup given through the English Aberdeen-Angus Cattle Association for the most points awarded in a combination of entries.

* Prizes given by the Dun and Belted Galloway Cattle Breeders' Association.

* The "Knockbrex" Perpetual Silver Challenge Cup given through the Dun and Belted Galloway Cattle Breeders' Association for the best animal.

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- 918 **III. (#5).**—MISS B. V. WAUDBY-GRIFFIN, Bromesbarrow Court, Dymock, Glos, for Bromesbarrow Myrtle, born Jan. 1, 1929; s. Mark Ewart 495B, d. Mochrum Malsie of Craigeach 706B by Boreland Pharaoh 90B.
913 **R. N.**—SIR AUGUST CAYZER, BART., for Gartmore Christian 1st.
H. C.—916.

Class 127.—Belted Galloway Heifers, born on or between December 1, 1929 and November 30, 1930.¹

- 925 **I. (#15).**—R. C. IRVING, Shenley Lodge, Ridge Hill, Barnet, for Shenley Duchess 2192B, born Jan. 7, 1930; s. Knockbrix Prince Imperial 109B (D), d. Shenley Lady Agnes 882B (D) by Mochrum Sir Robert of Craigeach 60B.
924 **II. (#10).**—R. C. IRVING, for Shenley Daisy 2184B (D), born April 6, 1930; s. Knockbrix Prince Imperial 109B (D), d. Shenley Index 854B by Mochrum Sir Robert of Craigeach 60B.
921 **III. (#5).**—SIR AUGUST CAYZER, BART., Gartmore House, Gartmore, Stirling, for Gartmore Norah 1st 2066B, born April 1, 1930; s. Glenzier Watermark 725B, d. Gartmore Bella 2nd by Mark Hector 56B.
927 **IV. (#4).**—MISS B. V. WAUDBY-GRIFFIN, Bromesbarrow Court, Dymock, Glos, for Bromesbarrow Elderberry, born March 5, 1930; s. Eastington Noon 883B, d. Knockbrix Edith 1282B by Mindork Admiral 58B.
922 **R. N.**—GEN. SIR IAN HAMILTON, 1, Hyde Park Gardens, London, W.2, for Lullenden Estelle 2nd.

Dairy Shorthorns.

Class 134.—Dairy Shorthorn Bulls, born in or before 1928.

- 953 **I. (#15, & Champion.)**—J. A. WILLIAMS, Castle Hill, Pannal Ash, Harrogate, for Greatwatt Clarence 2nd 223438, roan, born May 5, 1927, bred by R. Tustian, The Leys, Great Tew, Oxford; s. Sorbrook Clarence 194218, d. 43829 Greatwatt Hilda by Rickerscote Pimpernel 158806.
948 **II. (#10, & R. N. for Champion.)**—F. J. HARDY, Hall Farm, Higham-on-the-Hill, Nuneaton, for Kenilworth Grand Prince 9th 224087, roan, born Aug. 27, 1927, bred by E. Bostock, Gibbet Hill, Coventry; s. Streetaston Gold Prince 2nd 203202, d. 45360 Kirkbarrow Tulip by Cairngorm 147784.
946 **III. (#5).**—E. BOSTOCK, Gibbet Hill, Coventry, for Kenilworth Gold Prince 231216, roan, born Sept. 25, 1928; s. Streetaston Gold Prince 2nd 203202, d. 70961 Kenilworth Dairy Queen by Roan Duke 184495.
952 **IV. (#4).**—THE TRUSTEES OF WEST DEAN ESTATE, Staple Ash Farm, Chilgrove, Chichester, for Foxhill Wild Earl 230254, white, born Jan. 13, 1928, bred by the Rt. Hon. E. A. FitzRoy, Foxhill, West Haddon, Rugby; s. Foxhill Caryll 171702, d. 12841 Foxhill Wild Eyes by Afterthought 146582.
H. G.—945, 950.

Class 125.—Dairy Shorthorn Bulls, born in 1929.

- 957 **I. (#15).**—CAPT. THE RT. HON. E. A. FITZROY, M.P., Foxhill Cottage Farm, West Haddon, Rugby, for Foxhill Wild Meteor 237189, dark roan, born April 2; s. Aldenham Lord Kirklevington 212843, d. 73537 Foxhill Wild Maid 2nd by Foxhill Royal Charles 189835.
955 **II. (#10).**—DEBENHAM & TORY, Anderson, Blandford, for Anderson Imperial Minstrel 2nd 234697, white, born May 2; s. Anderson Bates 15th 220511, d. 25049 Fulmer Melody by Leam Commissioner 149958.
959 **III. (#5).**—SIR WILLIAM HICKING, BART., Brackenhurst Hall, Southwell, Notts, for Underley Prince George 240859, roan, born March 9, bred by Lord Henry Bentinck, Underley Hall, Kirkby Lonsdale; s. Foxhill Royal Charles 189835, d. 58343 Underley Stella by Lingbird 164839.
962 **IV. (#4).**—A. H. W. OSBORNE & SON, Branch Farm, Mells, Frome, for Bricklington Wanderer 2nd 235493, dark roan, born July 2; s. Foxhill Wild Hope 215655, d. 32592 Babraham Foremost 4th by Lord Lee 2nd 121257.
965 **V. (#3).**—S. OWEN WEBB, Streetly Hall, West Wickham, Cambs, for Streetly Horace 240563, roan, born Dec. 17; s. Streetly Dolphin 211796, d. Hilda 4th by Bright Knight 2nd 135418.
967 **R. N.**—CAPT. D. M. WILLS, Barley Wood, Wroughton, for Barleywood Carol Singer.

Class 136.—Dairy Shorthorn Bulls, born on or between January 1 and March 31, 1930.

- 968 **I. (#15, & Champion.)**—C. R. W. ADKINS, C.B., Babraham Hall, Cambridge, for Babraham Prim, roan, born Feb. 12; s. Batsford Prime Minister 2nd 220982, d. 44973 Babraham Crimson 10th by Lord Lee 2nd 121257.

¹ Prizes, except Fourth, given by the Dun and Belted Galloway Cattle Breeders' Association.

² Champion Prize of £10 given by the Dairy Shorthorn Association for the best Bull.

³ Special Prize of £10 given by the Dairy Shorthorn Association for the best Bull in Classes 136 to 138. The following cows in the pedigree of the Bull to be registered, or provisionally accepted for registration, as qualified cows in the Dairy Shorthorn Association's Register: (1) the sire's dam and her dam, (2) the dam and her dam, and (3) the dam of the dam's sire.

- 969 **II. (#10).**—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry, for *Snowstorm*, roan, born Jan. 7; s. *Winter Voyage* 220235, d. 62207 *Gracie* by *Grendon Lord James* 163779,
973 **III. (#5).**—DEBENHAM & TORY, Anderson, Blandford, for *Anderson Minstrel* 3rd, roan, born March 11; s. *Bladen Minstrel* 4th 213590, d. *Blackthorn Bud* by *Champion's Hero* 135646.
974 **IV. (#4).**—MAJOR R. F. FULLER, Great Chalfield, Melksham, Wilts, for *Chalfield Rosierucian* 16th, dark roan, born Feb. 13; s. *Chalfield Lord Spotless* 228897, d. 96891 *Chalfield Rose* 15th by *Preshrute Waterloo* Don 174965.
971 **V. (#3).**—SIR MARK COLLET, BART., St. Clare, Kemsing, Sevenoaks, for *Ightham Dairyman*, red and little white, born Feb. 1, bred by W. R. C. Ashby, Fen Pond Farm, Ightham, Sevenoaks; s. *St. Clare Imperialist* 226256, d. 33729 *Kenilworth Dairymaid* 17th by *Kenilworth Baron* 143245.
970 **R. N.**—ALBERT C. BROWN, The Gables, Fernhill Heath, Worcester, for *Tapenhall Milkman*. H. C.—980.

Class 137.—Dairy Shorthorn Bulls, born on or between April 1 and June 30, 1930.¹

- 985 **I. (#15).**—SIR MARK COLLET, BART., St. Clare, Kemsing, Sevenoaks, for *St. Clare Bar None* light roan, born June 9; s. *Pilling Masterpiece* 232565, d. 122000 *Pilling Sylvan Queen* by *Aske Wizard* 153487.
997 **II. (#10).**—E. MCGREGOR, Manor Farm, Lillington, Leamington Spa, for *Butterfly Dairyman*, roan, born April 26, bred by J. W. Dawson, Thwaite Hall, Greystoke, Penrith; s. *Harberwin Mascot* 216124, d. 69927 *Butterfly Queen* by *Premier Baron* 166011.
986 **III. (#5).**—SIR MARK COLLET, BART., for *St. Clare Pimpernel*, red and little white, born June 10; s. *Bourneplace Lord Pimpernel* 2nd 228422, d. 59676 *St. Clare Millicent Duchess* 2nd by *St. Clare Minstrel* 175870.
998 **IV. (#4).**—DR. ALFRED PALMER, Wokefield Park, Mortimer, for *Wokefield Dragoon*, roan, born April 11; s. *Wokefield Grand Duke* 212632, d. 71707 *Chalklands Duchess* by *Histon Wild Prince* 156497.
994 **V. (#3).**—SIR WILLIAM HICKING, BART., Brackenhurst Hall, Southwell, Nottingham, for *Brackenhurst Rosario*, red roan, born April 12; s. *Debden Cherry Bandit* 215063, d. 90360 *Debden Rose* by *Rushcourt Bandit* 2nd 202534.
982 **R. N.**—COL S. E. ASHTON, Scotsgrove House, Thame, for *Scotsgrove Dandy* 2nd. H. C.—988, 990. C.—991, 1007.

Class 138.—Dairy Shorthorn Bulls, born on or between July 1 and December 31, 1930.

- 1009 **I. (#15).**—C. J. ALLDAY, Fotheringhay Manor, Peterborough, for *Clapton Grand Duke*, roan, born July 13, bred by B. Wood, Clapton, Thrapston, Kettering; s. *Loobagh Baron* 25th 224616, d. 33882 *Duchess* 6th by *Loobagh Beau* 3rd 143635.
1013 **II. (#10).**—HENRY BUCKFORD, Standeford, Four Ashes, Wolverhampton, for *Standeford Dollar* 105th, roan, born July 17; s. *Standeford Dollar* 77th 219320, d. 58428 *Standeford Dolly* 100th by *Standeford Dollar* 58th 194302.
1010 **III. (#5, & R. N. for Champion).**—CAPT. T. ALLEN-STEVENS, Wicklesham Lodge, Faringdon, for *Wicklesham Lord Cran*, roan, born Sept. 9; s. *Thornby Governor* 211996, d. 67580 *Longhills Waterloo* 5th by *Babraham Lord Price* 140574.
1016 **IV. (#4).**—DEBENHAM & TORY, Anderson, Blandford, for *Anderson Royal Bates* 2nd, white, born Aug. 13; s. *Anderson Royal Bates* 195653, d. 79371 *Playford Red Rose* 10th by *Don Marigold* 162813.
1020 **V. (#3).**—E. J. MANNERS, The Old Hall, Netherseale, Burton-on-Trent, for *Netherseale Wild Eyes*, roan, born July 30; s. *Ravelstone Pear* 184224, d. 99017 *Hurts Ida* by *Haddon Foghorn* 181367.
1026 **R. N.**—J. S. TAYLOR, Kirby, Whatcote, Shipston-on-Stour, for *Whatcote Watercross* 2nd. H. C.—1022, 1028. C.—1014, 1015.
1009, 1053, 1091 **Cup.**—C. J. ALLDAY, for *Clapton Grand Duke*, *Fothering Foggathorpe*, and *Fothering Gay Nellie* 2nd.
994, 1035, 1056 **R. N. for Cup.**—SIR WILLIAM HICKING, BART., for *Brackenhurst Rosario*, *Brackenhurst Jean*, and *Debden Rose*.

Class 139.—Dairy Shorthorn Cows, in-milk, born on or before March 31, 1925, having yielded a minimum of 8,000 lb. of milk during a lactation period of 315 days.¹

- 1029 **I. (#15).**—GREENWOOD CHABTREE, Greystone Manor, Burley-in-Wharfedale, for 63219 *Lunesdale Barbara*, white, born Oct. 4, 1924, calved June 24, 1931, bred by J. E. Irving & Sons, Halton, Lancaster; s. *Carperby King* 161983, d. *Snelston Barbara* by *Royal Barrington* 122574.
1039 **II. (#10).**—E. MCGREGOR, Manor Farm, Lillington, Leamington Spa, for 58897 *Millbeck Lady Lucy* 3rd, white, born Jan. 31, 1924, calved May 4, 1931, bred by J. F. S. & A. Brownrigg, Millbeck Hall, Keswick; s. *Dairy Prince* 180025, d. 18087 *Lady Lucy* 4th by *Vain Rosette* 146078.

¹ Prizes, except Fourth and Fifth, given by the Dairy Shorthorn Association.

² See footnote 3 on previous page.

³ The "Grendon" Silver Challenge Cup given through the Dairy Shorthorn Association for the best group of one Bull and two Cows or Heifers. Two at least of the animals must have been bred by the exhibitor.

- 1035 III. (£5).—SIR WILLIAM HICKING, Bart., Brackenhurst Hall, Southwell, Notts, for 49994 Brackenhurst Jean, white, born June 21, 1923, calved May 4, 1931; s. Royal Ring-leader 166746, d. 1030 Grendon Jeanie by Lord Nottingham 116317.
- 1043 IV. (£4).—CECIL M. WILLS, M.C., Sherfield Court, Basingstoke, for 66482 Brae Easter Gift, roan, born April 19, 1924, calved May 1, 1931, bred by T. C. Pullinger, The Brae, Dumfries; s. Donald 142040, d. Darlington Dairymaid 2nd by Waterloo Wild King 118231.
- 1040 V. (£3).—E. MCGREGOR, for 60298 Sellarley Butterfly, roan, born Feb. 9, 1924, calved June 4, 1931, bred by T. Dawson, Sellarley, Lancaster; s. Baron Bridekirk 84th 178253, d. Butterfly Countess 2nd by Edgote Missive 136377.
- 1031 R. N.—J. ONSLOW FANE, Steventon Manor, Hants, for Rockley Folly.
H. C.—1037, 1042.

Class 140.—Dairy Shorthorn Cows, in-milk, born on or between April 1, 1925, and March 31, 1926, having yielded a minimum of 8,000 lb. of milk during a lactation period of 315 days.

- 1048 I. (£15).—E. MCGREGOR, Manor Farm, Lillington, Leamington Spa, for 76756 Honey-suckle 4th, red and white, born Oct. 4, 1925, calved June 13, 1931, bred by H. Mandal, Blackbeck, Troutbeck, Penrith; s. Stanton Kingfisher 194296, d. 40589 Honeysuckle 3rd by Royal Rosette 159088.
- 1046 II. (£10).—FREDERICK CHAPMAN, Chevet Grange, Wakefield, for 70434 Barugh Hermia, red, born Aug. 12, 1925, calved June 29, 1931, bred by J. Barnes & Son, Barugh Syke, Wighton; s. Barbara's Renown 187098, d. Barugh Maid by Barugh Enterprise 169024.
- 1052 III. (£5).—THE MARQUES OF ZETLAND, G.C.S.I., G.C.I.E., Aske, Richmond, Yorks, for 93270 Aske Lady Winsonia 6th, red and little white, born March 24, 1926, calved June 20, 1931; s. Butterfly Champion 179108, d. 57492 Aske Lady Winsonia 3rd by Royal Roger 159086.

Class 141.—Dairy Shorthorn Cows, in-milk, born on or between April 1, 1926 and March 31, 1927, having yielded a minimum of 6,500 lb. of milk during a lactation period of 315 days.

- 1057 I. (£15, & Champion.¹)—LAWRENCE HIGNETT, Hook End Farm, Hook End, Checkendon, Reading, for 85208 Pinkneys Tulip 5th, roan, born June 1, 1926, calved June 20, 1931, bred by F. T. Fisher, Pinkneys Green, Maidenhead; s. Checkendon Bandmaster 183853, d. 27594 Colescombe Tulip by Colescombe Graceful Lad 154898.
- 1062 II. (£10).—J. S. TAYLOR, Kirby, Whatcote, Shipston-on-Stour, for 85201 Pinkneys Lillian, roan, born April 10, 1926, calved June 14, 1931, bred by F. T. Fisher, Pinkneys Green, Maidenhead; s. Pinkneys Darlington Major 183845, d. 36290 Plaspower Lillian by Grendon Emperor 163771.
- 1056 III. (£5).—SIR WILLIAM HICKING, Bart., Brackenhurst Hall, Southwell, Notts, for 90360 Debben Rose, red roan, born June 27, 1926, calved May 29, 1931, bred by W. P. Robertson, Deans Farm, Debben, Saffron Walden; s. Rushcourt Bandit 2nd 202534, d. 66836 Debben Flashy Rose by Flashlight 163292.
- 1053 IV. (£4).—C. J. ALLDAY, Fotheringhay Manor, Peterborough, for 82014 Fothering Foggathorpe, roan, born April 27, 1926, calved April 15, 1931; s. Barrowford Conjuror 161187, d. 2990 Dupplin Portia by Greenleaf's Blend 142747.
- 1065 V. (£3).—G. WOOSTER, Pennbury Farm, Penn, Bucks, for 93131 Pennbury Foggathorpe, red roan, born Aug. 30, 1926, calved June 22, 1931; s. Lord Leicester 80th 191713, d. Aughton Foggathorpe by Grand Duke 120528.
- 1054 R. N.—SIR MARK COLLET, Bart., St. Clare, Kemsing, Sevenoaks, for St. Clare Miss 2nd.
H. C.—1061.

Class 142.—Dairy Shorthorn Cows or Heifers, in-milk, born on or after April 1, 1927.

- 1085 I. (£15, & R. N. for Champion.¹)—J. TIMBERLAKE, Hastoe Farm, Tring, for 102796 Hastoe Charming Lass, roan, born April 30, 1927, calved June 2, 1931; s. Double Imperial 206832, d. 13698 Freshwater Charming Lass 7th by Baron Desmond 168938.
- 1089 II. (£10).—CAPT. ARNOLD S. WILLS, Thornby Hall, Northampton, for 103820 Thornby Foggathorpe 30th, white, born June 16, 1927, calved June 3, 1931; s. Thornby Royal Cran 185653, d. Thornby Foggathorpe 2nd by Dreadnought 102049.
- 1072 III. (£5).—J. ONSLOW FANE, Steventon Manor, Hants, for 102757 Kingsthorpe Royal Ruby 3rd, red, born July 11, 1927, calved June 26, 1931, bred by F. H. Thornton, Kingsthorpe Hall, Northampton; s. Kingsthorpe Count Ruby 4th 208775, d. 80428 Kingsthorpe Royal Ruby by Sorbrook First Fiddle 185292.
- 1077 IV. (£4).—LAWRENCE HIGNETT, Hook End Farm, Hook End, Checkendon, Reading, for 97769 Checkendon Lady Barrington, red and little white, born Sept. 3, 1927, calved May 29, 1931; s. Aske Wild Prince 3rd 204565, d. 54267 Barrington Lucy by Cressida's Pride 162536.

¹ Champion Prize of £10, given by the Shorthorn Society for the best Cow or Heifer. A Silver Medal is given by the Shorthorn Society to the Breeder of the Champion Dairy Shorthorn Cow.

- 1076 V. (23).—SIR WILLIAM HICKING, BART., Brackenhurst Hall, Southwell, Notts, for 112961 Longhills Wild Eyes 4th, roan, born March 18, 1928, calved April 9, 1931, bred by Eustace Abel Smith, Longhills, Lincoln; s. Histon Wild Prince 156497, d. Wild Eyes Lady by Rigg Head Baron 138875.
1087 R. N.—THE DUKE OF WESTMINSTER, G.C.V.O., D.S.O., Eaton Home Farm, Aldford, Chester, for Eaton Winsonia.
H. C.—1066, 1067, 1068, 1070.

Class 143.—Dairy Shorthorn Heifers, in-milk to first calving, born on or after April 1, 1928.¹

- 1100 I. (£15).—LAWRENCE HIGNETT, Hook End Farm, Hook End, Checkendon, Reading, for 107457 Pinkneys Acomb 2nd, roan, born June 25, 1928, calved June 26, 1931, bred by F. T. Fisher, Pinkneys Green, Maidenhead; s. Checkendon Bandmaster 188353, d. 73410 Pinkneys Acomb by Ilford Double Waterloo 190745.
1091 II. (£10).—C. J. ALLDAY, Fotheringhay Manor, Peterborough, for 104315 Fothering Gay Nellie 2nd, dark roan, born Oct. 10, 1928, calved May 28, 1931; s. Histon Foggathorpe Dairyman 216355, d. 82016 Fothering Gay Nellie by Fothering Seraphim 198750.
1110 III. (£5).—J. TIMBERLAKE, Hastoe Farm, Tring, for 123674 Hastoe Barrington 17th, red, born Jan. 8, 1929, calved May 31, 1931; s. Double Imperial 206832, d. Hastoe Barrington 2nd by Duke of Acomb 119958.
1111 IV. (£4).—J. TIMBERLAKE, for 113638 Hastoe Lady Hermione 2nd, red, born June 21, 1928, calved April 7, 1931; s. Barrington Frontier 213358, d. Yeldersley Lady Hermione 2nd by Darlington Minor 119807.
1101 V. (23).—HOBBS & DAVIS, Kelmscott, Lechlade, for 108746 Kelmscott Melody 84th, red, born June 8, 1928, calved June 15, 1931; s. Sorbrook Foggathorpe Premier 3rd 219269, d. 74962 Kelmscott Melody 78rd by Kelmscott Imperialist 82nd 190999.
1102 R. N.—HOBBS & DAVIS, for Kelmscott Primula 197th.
H. C.—1090, 1116.

Lincolnshire Red Shorthorns.

Class 144.—Lincolnshire Red Shorthorn Bulls, born in or before 1929.

- 1121 I. (£15, & R. N. for Champion).—W. A. BUCHANAN, Watnall, Nottingham, for Melton Reformer 23891, born Dec. 29, 1927, bred by J. B. Riggall, Melton Ross, Barnetby; s. Anderby Red Pole 15112, d. Melton Rouge 11th by Langton Grange King 16646.
1124 II. (£10).—BUTLER SMITH, The Fields, Cropwell Butler, Nottingham, for Cropwell Ajax 24454, born March 19, 1929; s. Cropwell Prince 20229, d. Harlaxton Excellence by Cockerington Anderby 16282.
1120 III. (£5).—ALLEN & ORR, LTD., Owlcoats Farm, Heath Chesterfield, for Cockerington Normanby 12th 22832, born Oct. 28, 1926, bred by J. W. Needham & Sons, South Cockerington, Louth; s. Petwood Normanby 19700, d. Cockerington No. 12 by Cockerington Grainthorpe 16287.
1122 R. N.—WILLIAM GRANT, Skinnand Manor, Navenby, Lincoln, for Grimsby Grange Minister.

Class 145.—Lincolnshire Red Shorthorn Bulls, born in 1930.

- 1126 I. (£15, & Champion).—H. GORE BROWNE, Broombriggs, Woodhouse Eaves, Loughborough, for Cockerington Yarn 3rd 25123, born Jan. 1, bred by J. W. Needham & Sons, South Cockerington, Louth; s. Anderby Yarn 20951, d. Algarkirk Jessica 1st by Anderby Veracity 19099.
1120 II. (£10).—BUTLER SMITH, The Fields, Cropwell Butler, Nottingham, for Cropwell Barrister, born March 1; s. Cropwell Prince 20229, d. Harlaxton Excellence by Cockerington Anderby 16282.
1127 III. (£5).—BRIG-GEN. C. HOARE, C.M.G., C.B.E., Limber Hill, Habrough, Lincs, for Barnoldby Rough 25022, born April 2, bred by A. C. Burkinshaw, Hatcliffe, Grimsby; s. Ashfenby Roughcoat 23444, d. Barnoldby Dairymaid 2nd by Wolferton Bouncer 19055.

Class 146.—Lincolnshire Red Shorthorn Cows or Heifers, in-milk, born in or before 1928.³

- 1138 I. (£15).—RUSSELL WOOD, Bandish House, Hitchin, for Bandish Charm 8th, born June 29, 1925, calved May 19, 1931; s. Burton Ruby King 2nd 14314, d. Bandish Charm 4th by Sudbrooke Seaman 12976.
1135 II. (£10).—J. A. MARSDEN POPPLE, Daneshill, Stevenage, for Beacon Hill Dina 2nd, born March 9, 1928, calved May 28, 1931, bred by Col. C. de Paravicini, Birkholme Manor, Corby, Lincs; s. Anwick Victor 7th 19121, d. Beacon Hill Dina by Cockerington Anderby 16282.

¹ Prizes, except Fourth and Fifth, given by the Dairy Shorthorn Society.

² Champion Silver Challenge Cup given by the Lincolnshire Red Shorthorn Association for the best Bull.

³ Prizes given by the Lincolnshire Red Shorthorn Association.

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1133 III. (#5).—WILLIAM GRANT, Skinnand Manor, Navenby, Lincoln, for *Beacon Hill Floweret* 2nd, born March 1, 1928, calved Jan. 2, 1931, bred by Col. C. de Paravicini, Birkholme Manor, Corby, Lincs; s. Threekingham Talisman 23321, d. Beacon Hill Kana by Cockerington Anderby 16282.

1137 R. N.—RUSSELL WOOD, for *Bendish Ada* 8th.

Class 147.—Lincolnshire Red Shorthorn Cows, in-milk, born in or before 1926, showing the best milking properties.

1143 I. (#15).—FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill, for *Soothern Charm*, born Aug. 14, 1922, calved May 19, 1931, bred by B. G. Bowser, Soothern Manor, Lincoln; s. Balthby Patrol 16802, d. by Harpswell Viscount 8327.

1140 II. (#10).—JOHN EVENS & SON, Burton, Lincoln, for *Burton Amy* 14th, born June 22, 1926, calved May 3, 1931; s. Burton Diligence 2nd 19201, d. Burton Amy 10th by Bendish Burton 5th 13207.

1141 III. (#5).—JOHN EVENS & SON, for *Burton Jewess* 5th, born Oct. 17, 1923, calved May 22, 1931; s. Petwood Giant 17872, d. Burton Jewess by Priory Knight 11858.

1142 R. N.—JOHN EVENS & SON, for *Burton Venus* 12th.

Class 148.—Lincolnshire Red Shorthorn Cows or Heifers, in-milk, born in or after 1927, showing the best milking properties.¹

1146 I. (#15, & R. N. for Champion.²)—JOHN EVENS & SON, Burton, Lincoln, for *Burton Irene* 5th, born June 25, 1927, calved May 27, 1931; s. Burton Frost 21995, d. Burton Irene 2nd by Burton Cherry King 15465.

1145 II. (#10).—BENJAMIN GEORGE BOWSER, Soothern Manor, Lincoln, for *Soothern Columbine* 5th, born June 9, 1927, calved June 7, 1931; s. Soothern Fascination 19776, d. Soothern Columbine by Scampton Quorum 11926.

1148 III. (#5).—RUSSELL WOOD, Bendish House, Hitchin, for *Bendish Sunbeam* 10th, born May 16, 1928, calved May 30, 1931; s. Histon Dairyman 14th 20409, d. Bendish Sunbeam 6th by Bendish Seaman 7th 15814.

1147 R. N.—JOHN EVENS & SON, for *Burton Hempy* 16th.

Class 149.—Lincolnshire Red Shorthorn Heifers, born in 1929.

1151 I. (#15, & Champion.³)—H. GORE BROWNE, Broombriggs, Woodhouse Eaves, Loughborough, for *Broombriggs Tess*, born May 29; s. Saltfleet Waterloo 22442, d. Broombriggs Rachel by Swineshead Bill 20798.

150 II. (#10).—H. GORE BROWNE, for *Broombriggs Tatler*, born May 13; s. Saltfleet Waterloo 22442, d. Broombriggs Rummy by Stamford 16978.

1153 III. (#5).—WILLIAM GRANT, Skinnand Manor, Navenby, Lincoln, for *Skinnand Belle* 14th, born May 1; s. Melton Queen's Champion 23062, d. Skinnand Belle 12th by Anderby Workman 20027.

1149 R. N.—ALLEN & ORR, LTD., Owicotes Farm, Heath, Chesterfield, for *Owicotes Nora* 2nd.

Class 150.—Lincolnshire Red Shorthorn Heifers, born in 1920.

1158 I. (#15).—BUTLER SMITH, The Fields, Cropwell Butler, Nottingham, for *Cropwell Alice* 6th, born March 4; s. Cropwell Prince 20229, d. Cropwell Alice 4th by Cropwell Balancer 19291.

1159 II. (#10).—BUTLER SMITH, for *Cropwell Violet* 6th, born Jan. 29; s. Cropwell Prince 20229, d. Cropwell Violet by Harlaxton Balancer 17803.

1155 III. (#5).—H. GORE BROWNE, Broombriggs, Woodhouse Eaves, Loughborough, for *Broombriggs Undine*, born April 16; s. Saltfleet Waterloo 22442, d. Orgarth Hill No. 79 by Hallington Rising Star 2nd 14542.

1157 R. N.—WILLIAM GRANT, Skinnand Manor, Navenby, Lincoln, for *Skinnand Belle* 15th.

Red Polls.

Class 155.—Red Poll Bulls, born in or before 1923.

1171 I. (#15, & Champion.³)—THE EARL OF STRADBROKE, Henham Hall, Wangford, Beccles, Suffolk, for *Henham Rajah* 14935, born March 21, 1927; s. Hutton Assessor 13067, d. 28863 Henham Sweet Pear by Henham Dairyman 11379.

1168 II. (#10).—LADY LODGE, Leonardale, Horsham, for *Sporle Eastwood Ho* 15132, born Feb. 28, 1923, bred by T. S. Mathews, Sporle, Swaffham; s. Necton Minister 13880, d. 29279 Sporle Elegy by Allenby 11087.

1162 III. (#5).—HIS MAJESTY THE KING, Sandringham, Norfolk, for *Hatton Faber* 14151, born Sept. 14, 1926, bred by J. P. Arkwright, Hatton House, Warwick; s. Colwith David 11593, d. 24035 Hatton Fable by Acton Hussar 9381.

1166 IV. (#4).—J. N. KENDALL, Brimpsfield Park, Gloucester, for *Brimpsfield Barrister* 14456, born Feb. 6, 1927; s. Necton Minister 13880, d. 34802 Sporle Rapacity by Sudbourne Sandy 12460.

¹ Prizes given by the Lincolnshire Red Shorthorn Society.

² Champion Silver Challenge Cup given by the Lincolnshire Red Shorthorn Association for the best Cow or Heifer.

³ Champion Prize of £5 given by the Red Poll Cattle Society for the best Bull.

Awards of Live Stock Prizes at Warwick, 1931. xcix

- 1165 R. N.—THE HON. ERIC B. BUTLER HENDERSON, Winwick Manor, West Haddon, Rugby, for Gaddesby Edward.
H. C.—1163. C.—1164.

Class 156.—Red Poll Bulls, born in 1929.

- 1176 I. (£15, & R. N. for Champion.)—CAPT. ALAN RICHARDSON, Seven Springs, Cheltenham, for Seven Springs Quebec 15473, born June 11; s. Sudbourne Loyalist 11814, d. 30380 Seven Springs Quest by Harefield Clinker 11000.
1173 II. (£10.)—SIR M. E. MANNINGHAM BULLER, BART., Charlton Lodge, Banbury, for Didlington Dandy 15289, born July 23, bred by Didlington Estate Company, Didlington; s. Framlingham Count 14494, d. 37825 Didlington Dewdrop Srd by Didlington Daylight 12580.
1172 III. (£5.)—P. A. BAYMAN, Letheringham Abbey, Woodbridge, for Wanstead Albion 15508, born Jan. 3; s. Wanstead Davyson 14355, d. 36756 Wanstead Lady Srd by Easton Adamant 12273.
1174 R. N.—SIR HERBERT HAMBLING, BART., Rookery Park, Yoxford, Suffolk, for Yoxford Demon.
C.—1175.

Class 157.—Red Poll Bulls, born on or between January 1 and May 31, 1930.

- 1180 I. (£15.)—LADY CHESHAM, Latimer, Chesham, for Latimer Minstrel 15779, born March 21; s. Latimer Duke 14223, d. 27056 Knepp Meadow Dell by Knepp Mace 10884.
1188 II. (£10.)—N. A. HEYWOOD, Glevering Park, Wickham Market, Woodbridge, for Glevering Avocet 15706, born Jan. 25; s. Easton Pilgrim Father 12597, d. 28621 Combs Crocus Srd by Sudbourne Hero 11231.
1184 III. (£5.)—MRS. R. M. FOOT, White Hill, Berkhamsted, for White Hill Reggie, born Feb. 4; s. Basildon Regulator 14028, d. 38662 White Hill Fair Lady by Meddler Full Cry 13188.
1185 IV. (£4.)—MRS. R. M. FOOT, for White Hill Surtees 2nd, born Feb. 14; s. Meddler Full Cry 13188, d. 30569 White Hill Bluebelle by Sudbourne Hector 11224.
1182 V. (£3.)—MRS. C. N. DYER, Hydera, Crawley, for Hydera Alert One 15738, born March 24; s. Ashmoor Alert 13284, d. 34267 Kirtan Marion by Sudbourne Sam 12848.
1189 R. N.—LIEUT.-COL. O. HEYWORTH-SAVAGE, Bradwell Grove, Burford, Oxford, for Bradwell Dictator.
H. C.—1191, 1194. C.—1179.

Class 158.—Red Poll Bulls, born on or between June 1 and December 31, 1930.^a

- 1205 I. (£15.)—CAPT. ALAN RICHARDSON, Seven Springs, Cheltenham, for Sevensprings Quiver 15898, born Oct. 18; s. Sudbourne Loyalist 11814, d. 38334 Sevensprings Quartz by Knepp Ajax 11397.
1204 II. (£10.)—BRIG.-GEN. A. H. O. LLOYD, C.B., C.M.G., Leaton Knolls, Shrewsbury, for Leaton Goliath 15781, born Sept. 25; s. Glevering Pelican 13749, d. 37872 Leaton Glory by Lound Roadman 2nd 13116.
1196 III. (£5.)—LIEUT.-COL. SIR MERRIK R. BURRELL, BART., C.B.E., Knepp Castle, Horsham, for Knepp First Lord, born June 26; s. Knepp Senator 13836, d. 36479 Sharnon Primula by Colworth Primrose League 12564.
1198 IV. (£4.)—MRS. C. N. DYER, Hydera, Crawley, for Hydera Alert Three 15740, born Oct. 19; s. Ashmoor Alert 13284, d. 38408 Sporic Rose of Palgrave 2nd by Saham Rimini 13195.
1203 R. N.—J. N. KENDALL, Brimpsfield Park, Gloucester, for Brimpsfield Bogun.
H. C.—1197. C.—1206.

Class 159.—Red Poll Cows, in-milk, born in or before 1925.

- 1208 I. (£15, & Champion.)—CAPT. SIR H. E. DE TRAFFORD, BART., Newsells Park, Barkway, Royston, for 31320 Kirtan Patsy, born June 23, 1922, calved April 6, 1931, bred by W. F. Paul, Kirtan, Ipswich; s. Lichfield Victor 11406, d. 27947 Kirtan Prize by Red Cross 11051.
1212 II. (£10.)—CAPT. R. S. HALL, New Hall, Tendring, Clacton-on-Sea, for 36667 Theobalds Sunshine 5th, born July 16, 1925, calved Dec. 19, 1930, bred by Admiral Sir Hedworth Meux, Waltham Cross; s. Theobalds Duke 13237, d. 26987 Holton Sunshine 2nd by Framlingham Prince 11136.
1216 III. (£5.)—CAPT. ALAN RICHARDSON, Seven Springs, Cheltenham, for 33144 Sevensprings Quinna, born Oct. 12, 1923, calved March 23, 1931; s. Knepp Ajax 11397, d. 30380 Sevensprings Quest by Harefield Clinker 11000.
1211 IV. (£4.)—JOHN G. GRAY, Rosehill, Coventry, for 36358 Polstead Prolific, born Nov. 30, 1925, calved May 9, 1931, bred by F. Richardson, Polstead, Colchester; s. Ferrymore Ape 12608, d. 29177 Polstead Kate by Hun 2nd 11016.
1213 R. N.—SIR HERBERT HAMBLING, BART., Rookery Park, Yoxford, Suffolk, for Hanham Charlotte.
H. C.—1217.

^a Champion Prize of £5 given by the Red Poll Cattle Society for the best Bull.

^b Prizes, except Fourth and Fifth, given by the Red Poll Cattle Society.

^c Champion Prize of £5 given by the Red Poll Cattle Society for the best Cow or Heifer.

Class 160.—Red Poll Cows or Heifers, in-milk, born in 1926, 1927, or 1928.¹

- 1236 I. (£15, & R. N. for Champion.)—OWEN H. SMITH, Langham, Oakham, for 40537 Upton Queen B, born June 21, 1927, calved Feb. 16, 1931, bred by W. L. Horbury, Ditchford Farm, Moreton-in-the-Marsh; s. Hutton Fabulist 11983, d. 31504 Necton Queenie by Marham Armistice 11460.
- 1223 II. (£10).—LORD CRANWORTH, Grundisburgh, Suffolk, for 37530 Grundisburgh Wanderer, born July 4, 1926, calved May 16, 1931; s. Gresham Mainstay 13030, d. 32332 Grundisburgh Tourist by Framlingham Fanatic 12612.
- 1219 III. (£5).—LIEUT.-COL. SIR MERRIK R. BURRELL, BART., C.B.E., Knepp Castle, Horsham, for 39780 Knepp Prudence 8th, born Aug. 18, 1927, calved May 25, 1931; s. Knepp Meadow Marquis 13097, d. 27083 Knepp Prudence by Sudbourne Crown 10803.
- 1228 IV. (£4).—MRS. R. M. FOOT, White Hill, Berkhamsted, for 38657 White Hill Fair Briar, born Oct. 4, 1928, calved May 18, 1931; s. Meddler Full Cry 18138, d. 27246 Sprowston Briar 5th by Honingham Alcester 10424.
- 1231 V. (£3).—MRS. M. L. GRIFFITH, Little Hallingbury Park, Essex, for 38071 Morston Countess 3rd, born May 1, 1928, calved May 28, 1931, bred by A. T. Pratt, Morston, Ipswich; s. Newton Conductor 12088, d. 30235 Morston Countess by Alarum 10820.
- 1227 R. N.—MRS. M. M. FITZGERALD, Marsden Manor, Cirencester, for Marsden Mimus. H. G.—1221, 1230, 1288. C.—1220, 1233, 1235.

Class 161.—Red Poll Heifers, born in 1929.

- 1240 I. (£15).—S. W. COPLEY, Deacons Hill, Elstree, Herts, for 43130 Deacons Beurre, born April 27; s. Cotswold Flavius 13347, d. 32379 Ducklys Beurre by King Knepp of the Meadows 12039.
- 1244 II. (£10).—N. A. HEYWOOD, Glevering Park, Wickham Market, Woodbridge, for 43343 Glevering Puffin, born Feb. 1; s. Hallingbury Crossbow 13787, d. 33993 Glevering Isis by Easter Alysum 11620.
- 1245 III. (£5).—LIEUT.-COL. C. HEYWORTH-SAVAGE, Bradwell Grove, Burford, Oxford, for 42826 Bradwell Dorothy, born April 1; s. Bredfield Nathan 12945, d. 32391 Duns Tew Dinah by Knepp Crown 11162.
- 1243 IV. (£4).—SIR HERBERT HAMBING, BART., Rookery Park, Yoxford, Suffolk, for 44509 Yoxford Mavis 2nd, born June 23; s. Yoxford Challenger 14389, d. 30347 Royal Mavis by Royal Sunshine 11452.
- 1249 V. (£3).—THE MARQUIS OF NORTHAMPTON, D.S.O., Castle Ashby, Northampton, for 42607 Ashby Fabrica, born March 16; s. Abbeycombe Bixa 13995, d. 30428 Sporie Enamel by Easton Red Guard 11327.
- 1239 R. N.—HIS MAJESTY THE KING, Sandringham, Norfolk, for Royal Jewel. H. G.—1246. C.—1241.

Class 162.—Red Poll Heifers, born in 1930.

- 1258 I. (£15).—HIS MAJESTY THE KING, Sandringham, Norfolk, for Royal Titania, born Jan. 18; s. Hutton Faber 14151, d. 40228 Royal Fairy 2nd by Royal Crimson 11763.
- 1272 II. (£10).—OWEN H. SMITH, Langham, Oakham, for Banksborough Beryl, born March 22; s. Hutton Fabulist 11985, d. 28406 Witheringsett Beryl by Sudbourne Beacon 10619.
- 1263 III. (£5).—MRS. M. M. FITZGERALD, Marsden Manor, Cirencester, for 45731 Marsden Myra, born Feb. 7; s. Marsden Monopol 14622, d. 34448 Marsden Miramar by Antwick Minotaur 12300.
- 1261 IV. (£4).—MRS. C. N. DYER, Hyders, Crawley, for 45464 Hyders Ashberry One, born Jan. 20; s. Ashmoor Alert 13284, d. 39458 Hardwick Ashberry 3rd by Ashmoor Alert 13284.
- 1259 V. (£3).—LIEUT.-COL. SIR MERRIK R. BURRELL, BART., C.B.E., Knepp Castle, Horsham, for Knepp Ida 6th, born Jan. 14; s. Knepp Insurance 13832, d. 37837 Knepp Ida 5th by Gressenhall Marquis 11342.
- 1270 R. N.—W. H. PERKIN, Lillington Mews, Leamington Spa, for Spa Actress. H. G.—1264, 1267, 1268. C.—1257, 1263.

Blue Albions.**Class 163.—Blue Albion Bulls, born in or before 1928.**

- 1276 I. (£15, & R. N. for Champion.)—T. H. SWIRE & SONS, The Mount and Bellaport Farms, Norton-in-Hales, Market Drayton, for Mount Fearless 1731, born April 16, 1927; s. Fernilee Fearless 803, d. Mount Polly 5154.
- 1275 II. (£10).—W. E. GROVER, The Shrubberies, Snarestone, Burton-on-Trent, for Snarestone Jester 1799, born May 28, 1928; s. Barton Jude 2nd 1183, d. Snarestone Faith 7024.

¹ Prizes, except Fourth and Fifth, given by the Red Poll Cattle Society.² Champion Prize of £5 given by the Red Poll Cattle Society for the best Cow or Heifer.³ Perpetual Silver Challenge Cup given by the Blue Albion Cattle Society for the best Bull.

- 1277 **III. (#5).**—**RANDOLPH TORY**, Charisworth Manor, Blandford, for **Cowlease Champion** 1861, born Feb. 25, 1927, bred by Mrs. E. G. Tory, Charisworth, Blandford; s. Charisworth Blue Boy 933, d. Cliftonthorpe Lady 2nd 8524.

Class 164.—Blue Albion Bulls, born in 1929.¹

- 1278 **I. (#15, & Champion.)**—**T. H. CALDERBANK**, The Hall, Stow Maries, Chelmsford, for **Stow What's Wanted**, born May 3; s. Stow Manners 1579, d. Stow Cicely 11520 by Broomhill Threshold 499.
- 1282 **II. (#10).**—**JOSEPH J. JONES**, The Mount, Farnborough, Banbury, for **Farnborough Major**, born June 1, bred by R. H. A. Holbech, The Grange, Farnborough, Banbury; s. Pike Major 1329, d. Seagry Melody 6870.
- 1280 **III. (#5).**—**JOHN H. DAVIES**, Upper Rectory Farm, Appleby Magna, Burton-on-Trent, for **Magna Rob 2nd**, born Dec. 2; s. Magna Jock 1717, d. Magna Ruby 4878.
- 1283 **E. N.**—**T. H. SWIRE & SONS**, The Mount and Bellaport Farms, Norton-in-Hales, Market Drayton, for **Mount Laddie**.
H. C.—1281, 1284, 1285.

Class 165.—Blue Albion Bulls, born in 1930.¹

- 1287 **I. (#15).**—**W. E. GLOVER**, The Shrubberies, Snarestone, Burton-on-Trent, for **Snarestone Justice**, born Sept. 6; s. Snarestone Jester 1799, d. Snarestone Duchess 6th 11474 by Mountain Count 183.
- 1288 **II. (#10).**—**T. H. SWIRE & SONS**, The Mount and Bellaport Farms, Norton-in-Hales, Market Drayton, for **Mount Chief**, born July 6; s. Mount Fearless 1731, d. Mount Kitty 5112.
- 1291 **III. (#5).**—**JAMES WALL**, Bridge House, Rowley, Derbyshire, for **Woodland King**, born Aug. 29; s. Asherblue Clansman, d. Hassop Queenie 11192 by Charisworth Champion 259.
- 1286 **E. N.**—**PERCY DOBSON**, Manor Farm, Ridgwardine, Market Drayton, for **Ridgwardine Goalkeeper**.
H. C.—1289, 1296.

Class 166.—Blue Albion Cows or Heifers, in-milk, born in or before 1928.

- 1292 **I. (#15, & Champion.)**—**P. DOBSON**, Ridgwardine, Market Drayton, for **Remote of Ridgwood**, born in Sept., 1926, calved Feb. 3, 1931.
- 1296 **II. (#10, & E. N. for Champion.)**—**JOSEPH J. JONES**, The Mount, Farnborough, Banbury, for **Seagry Melody 6870**, calved June 30, 1931, breeder and age unknown.
- 1294 **III. (#5).**—**P. DOBSON**, for **Ringwood of Ridgwood**, born Sept. 23, 1923, calved June 22, 1931.
- 1295 **E. N.**—**W. E. GLOVER**, The Shrubberies, Snarestone, Burton-on-Trent, for **Pike Dandy**,
H. C.—1297, 1298. C.—1293.

Class 167.—Blue Albion Heifers, born in 1929.

- 1300 **I. (#15).**—**P. DOBSON**, Ridgwardine, Market Drayton, for **Ridgwardine Sweetheart 4th**, born April 3; s. Ridgwardine Emperor 1559, d. Ridgwardine Sweetheart 2nd 10600 by Elton Monarch 301.
- 1302 **II. (#10).**—**T. H. SWIRE & SONS**, The Mount and Bellaport Farms, Norton-in-Hales, Market Drayton, for **Mount Crocus 3rd**, born Aug. 11; s. Mount Fearless 1731, d. Mount Crocus 2nd 9598 by Mountain Mildman 85.
- 1303 **III. (#5).**—**T. H. SWIRE & SONS**, for **Mount Ethel 2nd**, born Jan. 8; s. Mount Goalkeeper 1049, d. Blackmore Ethel 2154.
- 1304 **E. N.**—**C. H. WEBSTER**, Ivonbrook Farm, Grange Mill, Wirksworth, Derbyshire, for **Ivonbrook Hilda**.

Class 168.—Blue Albion Heifers, born in 1930.¹

- 1305 **I. (#15).**—**T. H. CALDERBANK**, The Hall, Stow Maries, Chelmsford, for **Stow Nancy**, born Sept. 1; s. Bulpnan King 1499, d. Stow Blue Gown 11518 by Broomhill Threshold 499.
- 1306 **II. (#10).**—**P. DOBSON**, Ridgwardine, Market Drayton, for **Ridgwardine Carnation**, born Aug. 13; s. Stow Manners 1579, d. Ridgwardine Damsel 6372.
- 1308 **III. (#5).**—**T. H. SWIRE & SONS**, The Mount and Bellaport Farms, Norton-in-Hales, Market Drayton, for **Mount Ethel 3rd**, born Jan. 8; s. Mount Fearless 1731, d. Blackmore Ethel 2154.
- 1307 **E. N.**—**JOSEPH J. JONES**, The Mount, Farnborough, Banbury, for **Farnborough Crocus**.
H. C.—1309.

¹ Prizes given by the Blue Albion Cattle Society.

² Perpetual Silver Challenge Cup given by the Blue Albion Cattle Society for the best Bull.

³ Perpetual Silver Challenge Cup given by the Blue Albion Cattle Society for the best Cow or Heifer.

British Friesians.

The letters F.R.S. after the number of an animal indicate that such animal is registered in the Friesch Rundvee Stamboek (Friesland Cattle Herd Book) Zwaarteboete (Black and White) Section.

The letters F.H.B., S.A., after the number of an animal indicate that such animal is registered in the Friesland Herd Book, South Africa.

The letters S.A.S.B. after the name of an animal indicate that such animal is registered in the South African Stud Book.

The letters P.I. after the name of an animal indicate that such animal is of pure imported Friesian (Holland) or South African blood.

Unless otherwise stated the number refers to the British Friesian Herd Book.

Class 169.—British Friesian Bulls, born in or before 1928.¹

- 1310 I. (#15, & Champion.²)—GEORGE GEE, Ely Grange, Frant, Sussex, for Douneside Marcellus 34183, born Oct. 2, 1928, bred by the Trustees of Sir A. W. MacRobert, Bart., Douneside, Tarland, Aboyne; s. Douneside Pel Klaas 30901 P.I., d. Douneside Maris 92536 by Douneside Hatsumerschaap 13719 P.I.
- 1311 II. (#10, R. N. for Champion.³ & Champion.⁴)—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside Masterpiece 19835, born Oct. 26, 1922, bred by the late Sir Alasdair W. MacRobert, Bart.; s. Cradlehall (imp) Hollander 2nd 3737, d. Lochlands Molly Mine 34616 by Kirkhill Law 5269.
- 1316 III. (#5.)—HAROLD TATLOW, Brome Hall, Lapworth, Birmingham, for Balmachree Hugo 33769, born June 1, 1928, bred by D. A. MacLennan, Balmachree, Inverness; s. Lochlands Rijper 29237 P.I., d. Balmachree Amelia 50400 by Seaton David 12683.
- 1313 R. N.—H. & B. POOLE, Akenham Hall, Ipswich, for Lawford Garriek.
H. C.—1314.
- 1311, 1396, 1419 Trophy.—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., for Douneside Masterpiece, Douneside Aster, and Douneside Beula 5th.
- 1339, 1425, 1436 R. N. for Trophy.—JOHN R. UPSON, for Saracens Meibloem Don, Saracens Nancy, and Saracens Myrtle.

Class 170.—British Friesian Bulls, born in or between January 1 and June 30, 1929.

- 1318 I. (#15, & R. N. for Champion.⁵)—ERNEST B. HALL, Hales Hall, Market Drayton, for Hales Burika 35865 P.I., born Jan. 20; s. Hache Buringa 25871 P.I., d. Hales Rika 2nd 105484 by Clockhouse King Akryn 11321 P.I.
- 1319 II. (#10.)—JOHN E. MOFFITT, East House, Dalton, Northumberland, for Chellaston Karel 2nd 35469 P.I., born Jan. 2, bred by F. W. Gilbert, The Manor, Chellaston, Derby; s. Thurston Karel 3rd 32005 P.I., d. Ongar Weipkje 2nd 41114 P.I. by Wigginton Johan 7165 P.I.

Class 171.—British Friesian Bulls, born on or between July 1 and December 31, 1929.

- 1322 I. (#15.)—D. P. WHITEFIELD, Moreton Lodge, Balsall Common, Coventry, for Saracens Ghiet 36475, born July 6, bred by J. R. Upson, Rush Court, Wallingford; s. Hache Burlinze 25873 P.I., d. Northdean Ceres Myrtle 2nd 55602 by Dell Hollander 7655 P.I.
- 1321 II. (#10.)—ERIC SYKES, Richings Park, Iwer, Bucks, for Craigelmains Premier 35541 P.I., born Dec. 22, bred by James Kilpatrick, Craigie Mains, Kilmarnock; s. Hache Felix 34323 P.I., d. Craigelmains Belle 2nd 69936 P.I. by Glyndebourne (imp. 1923) Rikus 2011.

Class 172.—British Friesian Bulls, born on or between January 1 and June 30, 1930.

- 1339 I. (#15.)—JOHN R. UPSON, Rush Court, Wallingford, for Saracens Meibloem Don 38073 P.I., born March 11; s. Hache Burlinze 25873 P.I., d. Northdean Meibloem 5th 96982 P.I. by Northdean (imp. 1922) Marthus Beatty 21081.
- 1335 II. (#10.)—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside Signet 3rd 37267, born Jan. 31; s. Lochlands Rijper 29237 P.I., d. Douneside Sloe 2nd 92546 by Hache Apollo 22925 P.I.
- 1340 III. (#5.)—SIR ERNEST S. WILLS, BART., Littlecote, Hungerford, for Hales Burelma 2nd 37467 P.I., born Jan. 30, bred by Ernest B. Hall, Hales Hall, Market Drayton; s. Hache Buringa 25871 P.I., d. Hales Trethelma 2nd 71858 P.I. by Dunnald Kurrijploh 13851 P.I.
- 1338 IV. (#4.)—MRS. GRAHAM REES-MOGE, Clifford Manor, Stratford-on-Avon, for Saracens Dennis 38055 P.I., born March 12, bred by J. R. Upson, Rush Court, Wallingford; s. Saracens Meibloem Beatty 35449 P.I., d. Lamcoote (imp. 1922) Renske 63332 by Bedford Wietze 13th 1276 S.A.S.B.
- 1337 V. (#3.)—H. & B. POOLE, Akenham Hall, Ipswich, for Lawford Jaehin 37667, born Jan. 20; s. Henbury Karel Conjuror 26019 P.I., d. Lawford Agnes 54576 by Clockhouse Boterbloss 9311.
- 1323 R. N.—ARTHUR ALLEN, The Manor, Chesterblade, Somerset, for Glen Bruce.
H. C.—1324, 1328, 1341.

¹ Prizes given by the British Friesian Cattle Society.

² Champion Prize of £10 given by the British Friesian Cattle Society for the best Bull.

³ The "Wobaston" Silver Challenge Cup, given through the British Friesian Cattle Society the best Bull, bred by Exhibitor.

⁴ Perpetual Bronze Challenge Trophy given by the Friesland Cattle Breeders' Association of South Africa for the best group of three animals bred by Exhibitor.

Class 173.—British Friesian Bulls, born on or between July 1 and December 31, 1930.

- 1357 I. (#15).—WILLIAM TURNER, Offerton, Hindlip, Worcester, for Hawthorn Jason 37533, born Sept. 19; s. Hache Bravery 25863, d. Hawthorn Japonica 105784 by Hedges Anema 20293.
 1349 II. (#10).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside Home Farm, Tarland, Aboyne, for Douneside Knight 4th 37261, born July 30; s. Lochlands Ripper 29237 P.I., d. Douneside Kathleen 81182 by Douneside Hatsumerschaap 13719 P.I.
 1343 III. (#5).—ERNEST B. HALL, Hales Hall, Market Drayton, for Hales Chablis 37477, born Oct. 29; s. Hache Burling 25871 P.I., d. Hache Deshabille 105396 by Hache Cerjan Ulysses 14165 P.I.
 1346 IV. (#4).—JOSEPH LLEFFE, Port House, Coventry Road, Hinckley, for Progress King Bacchus 2nd 37951, born Sept. 11; s. Progress King Bacchus 34863, d. Astonville Bountiful 3rd 100796 by Northdean Hollander 3rd 23845 P.I.
 1355 V. (#3).—CAPT. F. E. STOBART, Abingworth, Pulborough, Sussex, for Abingworth Chief 36725, born Aug. 25; s. Terling Matador 31937, d. Abingworth Countess 111976 by Compton Admiral Beatty 25273.
 1354 E. N.—MISS E. MARTIN SMITH, Grange Court, Portington, Howden, Yorks, for Portington Beatty's Gaybird.
 H. C.—1344, 1353.

Class 174.—British Friesian Cows, in-milk, born in or before 1925, having yielded a minimum of 8,000 lb. of milk during a lactation period of 315 days.¹

- 1364 I. (#15, & E. N. for Champion).—T. E. GLADSTONE, Margery Flatts, Lanchester, Co. Durham, for Royds Glossie 75892, born July 3, 1923, calved May 1, 1931, bred by R. W. Wickham, Kirk Embay, Skipton-in-Craven; s. Terling (imp. 1922) Marthus 21533, d. Terling Glossie 10th 49214 by Becles (imp.) Lodewijk 3501.
 1362 II. (#10).—CAPT. JOHN CHRISTIE, M.C., Glyndebourne, Ringmar, Lewes, for Glyndebourne Torch 5th 82212, born Nov. 20, 1924, calved May 21, 1931; s. Glyndebourne (imp. 1922) Rikus 20111, d. Terling Torch 15th 36230 by Lavenham (imp.) Gysbrecht 4077.
 1361 III. (#5).—CAPT. JOHN CHRISTIE, M.C., for Glyndebourne Rik Lettice 82208, born July 27, 1924, calved May 18, 1931; s. Glyndebourne (imp. 1922) Rikus 20111, d. Teston Bles Lettice 49310 by Petygards (imp.) Bles Albert 4321.
 1359 IV. (#4).—ARTHUR ALLEN, The Manor, Chesterblade, Somerset, for Glen Nara 71540, born Jan. 2, 1923, calved March 7, 1931; s. Kingswood Ynteseries 14531, d. Glen Nevada 39202 by Garton Bravo 3rd 6251.
 1360 V. (#3).—E. G. BARTON, Saundby, Retford, for Chaddesley Hedge Rose 2nd 69470, born April 16, 1923, calved June 19, 1931, bred by J. H. Bean, Chaddesley Corbett, Kidderminster; s. Chaddesley Comrade 13497, d. Chaddesley Hedge Rose 43954 by Glenanne Pioneer 7923.

Class 175.—British Friesian Cows, in-milk, born in 1926 or 1927, having yielded a minimum of 6,500 lb. of milk during a lactation period of 315 days.¹

- 1380 I. (#15, & Champion).—JOHN R. UPSON, Rush Court, Wallingford, for Moulsoe Elsie 2nd 103134, born Jan. 12, 1926, calved April 14, 1931, bred by Randall Bros., Newport Pagnell; s. Moulsoe Golden King 18087, d. Moulsoe Elsie 74536 by Felthampton Cautious 13947.
 1374 II. (#10).—MAJOR B. M. EDWARDS, M.C., Hardingham Hall, Norwich, for Hardingham Melham 105638, born Nov. 13, 1926, calved May 7, 1931; s. Northdean Hollander 4th 26675 P.I., d. Hardingham Bramrinschaap 82642 by Douneside Hollander 2nd 16645 P.I.
 1379 III. (#5).—MRS. GRAHAM REES-MOGG, Clifford Manor, Stratford-on-Avon, for Northdean Barbara 2nd 108462 P.I., born April 8, 1926, calved May 21, 1931, bred by the late G. Holt Thomas, Hughenden, Bucks; s. Northdean Melbloom's Beatty 26679 P.I., d. Northdean Barbara 74624 P.I. by Northdean (imp. 1922) Marthus Beatty 21081.
 1375 IV. (#4).—ETHELBERT FURNESS, Hamels Park, Buntingford, for Blyth Elsie 113102, born March 1, 1927, calved June 30, 1931, bred by the late Lord Barnby, Blyth, Worksoop; s. Hamels Froukje's Roland 22985 P.I., d. Crosbie Princess 60470 by Terling Donovan 8805.
 1376 E. N.—T. E. GLADSTONE, Margery Flatts, Lanchester, Co. Durham, for Dignit Fable.

Class 176.—British Friesian Heifers, in-milk to first calving, born on or after January 1, 1928.¹

- 1385 I. (#15).—PIDDINGTON (NORTHANTS) ESTATES, LTD., Horton, Northampton, for Holyport Irene 128096 P.I., born Sept. 12, 1928, calved June 4, 1931, bred by H. M. Martineau, Holyport, Maidenhead; s. Hedges Second Series 6427 P.I., d. Mapleton Irene 84798 P.I. by Mapleton (imp. 1922) Rikko 20907.
 1381 II. (#10).—ALFRED J. CREED, Goldcoote House, Stratford-on-Avon, for Randocourt Peridot 131066, born Aug. 29, 1928, calved May 2, 1931, bred by E. Slinger, Hazelcoote, Kingscoote; s. Holyport Ulysses 28887 P.I., d. Craigie Peridot 51680 by Duminald Isaac 9535.
 1388 III. (#5).—ERIC SYKES, Richings Park, Iwer, Bucks, for Richings Hawkrigg Daisy 131184, born May 23, 1928, calved June 21, 1931; s. Kingswood Beatty's Challenger 29021, d. Kingswood Ceres Daisy 39928 by Hedges Second Series 6427 P.I.

¹ Prizes, except Fourth and Fifth, given by the British Friesian Cattle Society.

² Champion Prize of £10, given by the British Friesian Cattle Society for the best Cow or Heifer.

Class 177.—British Friesian Heifers, born on or between January 1 and June 30, 1929.

- 1396 I. (£15).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside Aster 136012, born May 11; s. Douneside Masterpiece 19835, d. Douneside Anice 103982 by Hache Apollo 22925 P.I.
- 1390 II. (£10).—ARTHUR ALLEN, The Manor, Chesterblade, Somerset, for Glen Wallaby 137032, born April 21; s. Glen Akrim 31035, d. Glen Waiwera 82144 by Kingswood Ynteseries 14531.
- 1393 III. (£5).—GEORGE GEE, Ely Grange, Frant, Sussex, for Herrington Hatsumer Jean 137718 P.I., born Jan. 22, bred by A. Weightman, Middle Herrington Farm, Sunderland; s. Wychnor Jan 24645 P.I., d. Mapleton Hilko's Hatsumer 73954 P.I. by Mapleton (imp. 1922) Hilko 20907.
- 1397 IV. (£4).—T. H. MERRICK, Hurdlesgrove, Whitechurch, Aylesbury, for Holyport Renceres 2nd 137900, born April 19, bred by H. M. Martineau, Holyport, Maidenhead; s. Hedges Second Series 6247 P.I., d. Haydon (imp. 1922) Rensche 62370 S.A.S.B. by Bedford Fel Knol 2nd 471.
- 1392 R. N.—ETHELBERT FURNES, Hamels Park, Buntingford, for Hamels Lark.
H. C.—1399, 1400.
- 1396, 1419, 1420 Cup.—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., for Douneside Aster, Douneside Beula 5th, and Douneside Hatsumer 5th.
- 1380, 1425, 1436 R. N. for Cup.—JOHN R. UPSON, for Moulsee Elsie 2nd, Saracens Nancy, and Saracens Myrtle.

Class 178.—British Friesian Heifers, born on or between July 1 and December 31, 1929.

- 1404 I. (£15).—ARTHUR J. HILL, Denton Park, Ben Rhydding, Yorks, for Ahill Godiva 133124, born Sept. 27; s. Ahill Paul 33675, d. Knebworth Ceres Vixen 117952 by Knebworth (imp. 1922) Ceres 2nd 20607.
- 1403 II. (£10).—W. H. R. GILBERT, The Cottage, Aston Flamville, Hinckley, for Astonville Dairymaid 3rd 133296, born Oct. 18; s. Northdean Hollander 3rd 23845 P.I., d. Sudbourne Dairymaid 42132 by Golf (imp.) Botermijn 3919.
- 1405 III. (£5).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside Mimula 136026, born Aug. 30; s. Douneside Masterpiece 19835, d. Douneside Bertus Minna 2nd 115320 by Hache Apollo 22925 P.I.
- 1407 R. N.—PIDDINGTON (NORTHANTS) ESTATES, LTD., Horton, Northampton, for Piddington Margery.
H. C.—1401, 1406, 1408.

Class 179.—British Friesian Heifers, born on or between January 1 and June 30, 1930.¹

- 1419 I. (£15).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside Beula 5th 145894, born June 4; s. Douneside Masterpiece 19835, d. Douneside Beula 70586 by Douneside Hatsumerschaap 13719 P.I.
- 1420 II. (£10).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., for Douneside Hatsumer 5th 145902 P.I., born Jan. 10; s. Lochlands Rijper 29237 P.I., d. Douneside Hatsumer 4th 104000 P.I. by Hache Apollo 22925 P.I.
- 1418 III. (£5).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., for Douneside Albert's Minnie 145890, born Feb. 10; s. Douneside Masterpiece 19835, d. Douneside Albert's Minna 92510 by Douneside Hatsumerschaap 13719 P.I.
- 1417 IV. (£4).—JOSEPH LIPPE, Port House, Coventry Road, Hinckley, for Progress Juliana 150518, born March 5; s. Astonville Vic-Beatty 30341, d. Progress Nicely 120456 by Hedges Bles Jan 28799.
- 1411 V. (£3).—MAJOR B. M. EDWARDS, M.C., Hardingham Hall, Norwich, for Hardingham Bramwell 147340, born April 26; s. Groundwell Fokke 43rd 32817, d. Hardingham Meltram 105638 by Northdean Hollander 4th 26675 P.I.
- 1423 R. N.—MRS. GRAHAM REES-MOGG, Clifford Manor, Stratford-on-Avon, for Clifford-chambers Gazelle.
H. C.—1409, 1413, 1414, 1422, 1424, 1425.

Class 180.—British Friesian Heifers, born on or between July 1 and December 31, 1930.

- 1434 I. (£15).—MRS. GRAHAM REES-MOGG, Clifford Manor, Stratford-on-Avon, for Clifford-chambers Gemma 144982, born July 20; s. Washway Premier 33615, d. Hamels Happy Lassie 94010 by Hamels Froukje's Roland 22985 P.I.
- 1432 II. (£10).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., Douneside, Tarland, Aboyne, for Douneside May 145920, born Oct. 11; s. Douneside Hollander 4th 34157 P.I., d. Douneside Molly 4th 115338 by Lochlands Hollander 29235 P.I.

¹ Silver Challenge Cup given through the British Friesian Cattle Society for the best group of three Cows or Heifers.

² Prizes, except Fourth and Fifth, given by the British Friesian Cattle Society.

- 1431 III. (#5).—THE TRUSTEES OF SIR ALASDAIR W. MACROBERT, BART., for Douneside Ischia 6th 145906, born July 9; s. Douneside Hatland 34155 P.I., d. Douneside Ischia 3rd 92534 by Douneside Hatsumerschaap 13719 P.I.
 1436 IV. (#4).—JOHN R. UPSON, Rush Court, Wallingford, for Saracens Myrtle 150966, born July 18; s. Saracens Burigo 84933, d. Saracens Myrtle Queen 120960 by Northdean Melbloom's Beatty 26679 P.I.
 H. C.—1426, 1429, 1430.

Ayrshires.

Class 181.—Ayrshire Bulls, born on or before September 1, 1930.

- 1441 I. (#15).—A. W. MONTGOMERIE, Lessnessock, Ochiltree, Ayrshire, for Lessnessock Sunny Jim 28457, born March 3, 1928; s. Low Balcray Sunny Jim 26356, d. Friendlesshead Nannie Whitelegs 2nd 81679 by Slodahill Rhonda 17852.
 1440 II. (#10).—EDWARD GREENSHIELDS, Ivy House, East Herrington, Sunderland, for Catlins Barquentine 30846, born Jan. 7, 1929, bred by M. Cochran, Catlins, Lockerbie; s. Catlins Felix 28876, d. Ryemuir Judy 3rd 76940 by Netherhall Reserve 17503.
 1437 III. (#5).—THOMAS BARR, Hobsland, Monkton, Ayrshire, for Hobsland Discoverer 29948, born Oct. 12, 1929; s. Netherhall Enterprise 27859, d. Hobsland Princess 4th 88590 by Hobsland Luckyboy 16482.
 1443 R. N.—DAVID WALLACE, Auchinbrain, Mauchline, Ayrshire, for Auchinbrain Morning Sun.

Class 182A.—Ayrshire Cows, in-milk, born on or before September 1, 1927.

- 1456 I. (#15, & Champion.¹).—A. & A. KIRKPATRICK, Barr, Sanquhar, Dumfries, for Barr June 7210, born June 6, 1925, calved June 24, 1931; s. Sandhill Flashlight 21331, d. Barr Flirt A 8026 by Burnside Lord Flashwood 13470.
 1461 II. (#10).—ROBERT MACKAY, Bruchag, Rothesay, for Ballochmartin Flowergirl 2nd 4351, born April 3, 1925, calved Oct. 3, 1930; s. Ballochmartin Pearlstone 24287, d. Ballochmartin Flowergirl 91518 by Howie's High Tide 15284.
 1452 III. (#5).—JOHN N. DRUMMOND, Bargower, Hurlford, Ayrshire, for Bargower Princess 7th 7640, born April 27, 1926, calved July 5, 1931; s. Riggfoot Paymaster 23854, d. Bargower Princess 6th 97394 by Auchinbrain Rupert 18469.
 1460 IV. (#4).—DUGALD MACKAY, Lea Farm, Watford, for Cauldhame Wallflower 3rd 2127, born Dec. 11, 1924, calved July 6, 1931, bred by John Craig, Cauldhame, Dunlop, Ayrshire; s. Netherton Balderston 18379, d. Cauldhame Wallflower 72896 by Cauldhame Rising Sun 14837.
 1447 V. (#3).—H. J. CLARK, Oldner House, Chipping Norton, for Oldner Maggie 13177, born Nov. 29, 1926, calved June 22, 1931; s. Ickham Mascot 24352, d. Calgton Maggie 7th 89784 by Hobsland Lucky Star 19597.
 1462 R. N.—A. W. MONTGOMERIE, Lessnessock, Ochiltree, Ayrshire, for Pickens Nannie.

Class 182B.—Ayrshire Cows, in-calf, born on or before September 1, 1927.

- 1444 I. (#15, & R. N. for Champion.²).—MRS. W. W. BOURNE, Garston Manor, Watford, for Ballochmartin Cinderella 7th 4345, born June 10, 1925, bred by Robert Mackay, Bruchag, Rothesay; s. Ballochmartin Pearlstone 24287, d. Ballochmartin Cinderella 4th 91510 by Netherton McBeth 18393.
 1454 II. (#10).—A. B. HOWIE, Eshott Brooks, Felton, Morpeth, for Brooks Dandy 7414, born Nov. 5, 1925; s. Howie's Night Patrol 23743, d. Catlins Dandelion 70925 by Hobsland Bellringer 15087.
 1463 III. (#5).—THE NATIONAL SOCIETY FOR EPILEPTICS, Chalfont Colony, Bucks, for Bruchag Pearl 11th A 8600, born May 4, 1920, bred by Mrs. Mackay, Bruchag, Rothesay; s. Auchinbrain Captivator 17532, d. Bruchag Pearl B. 2623 by Bruchag Ardyne 7453.
 1446 R. N.—H. J. CLARK, Oldner House, Chipping Norton, for Oldner Cherry Blossom.

Class 183A.—Ayrshire Cows or Heifers, in-milk, born after September 1, 1927, and before September 1, 1929.³

- 1474 I. (#15).—H. J. CLARK, Oldner House, Chipping Norton, for Oldner Cherry Blossom 2nd 21385, born June 11, 1928, calved June 22, 1931; s. Ockham Mascot 24352, d. Oldner Cherry Blossom 8948 by Rigg Jupiter 19433.
 1477 II. (#10).—ROBERT CROSS, Knockdon, Maybole, Ayrshire, for Knockdon Derby 6th 24406, born Oct. 13, 1928, calved June 22, 1931, bred by the late Thomas Cross, Knockdon; s. Dalgic Baron 23163, d. Knockdon Dairy Lass 8033 by Knockdon Norman 23892.
 1485 III. (#5).—CLEMENT B. TORRY, Higher Burton House, Dorchester, for Minton Glory 26570, born Nov. 26, 1928, calved July 5, 1931; s. Southwick Headmaster 25570, d. Edingham Glory 2nd 9726 by Chapmantown MacAndrew 13549.

¹ The "Cowhill" Silver Challenge Cup given through the Ayrshire Cattle Herd Book Society for the best Ayrshire. A Prize of £5 is given by the Ayrshire Cattle Herd Book Society to the winner of the Cup each year.

² Prizes, except Fourth, given by the Ayrshire Cattle Herd Book Society.

1482 IV. (54.).—NATIONAL SOCIETY FOR EPILEPTICS, Chalfont Colony, Bucks, for *Hightae Lily* 15th 21844, born Sept. 27, 1927, calved July 2, 1931, bred by Thomas White, Hightae, Castle Douglas; s. Auchenbainzie Royal Review 24808, d. Hightae Lily 7th 941 by Hightae Commander 24076.

Class 183B.—Ayrshire Cows or Heifers, in-calf, born after September 1, 1927, and before September 1, 1929.¹

1472 I. (515.).—THOMAS BARR, Hobsland, Monkton, Ayrshire, for Hobsland Peerie 9th 22890, born Feb. 7, 1929; s. Netherhall Enterprise 27359, d. Hobsland Peerie 7th 200 by Hobsland Luckyboy 16482.

1480 II. (510.).—DUGALD MACKAY, Lea Farm, Watford, for Mackay's Pearl, born Sept. 9, 1927; s. Mackay's Top Grade 27902, d. Bruchag Pearl 3rd A 2071 by Bruchag Marquis 10176.

1471 III. (55.).—THOMAS BARR, for Hobsland Netta 2nd 22889, born Feb. 4, 1929; s. Netherhall White Hope 27867, d. Hobsland Netta 88577 by Hobsland Luckyboy 16482.

1479 R. N.—A. B. HOWIE, Eshott Brooks, Felton, Morpeth, for Brooks Brown Lady.

Class 184.—Ayrshire Heifers, born on or after September 1, 1929.

1487 I. (515.).—THOMAS BARR, Hobsland, Monkton, Ayrshire, for Hobsland Nancy 23rd 28714, born March 14, 1930; s. Howie's Investment 28427, d. Hobsland Nancy 13th 95047 by Hobsland Luckyboy 16482.

1494 II. (510.).—DAVID WALLACE, Auchenbrain, Mauchline, Ayrshire, for Auchenbrain Grummie 23rd, born March 29, 1930; s. Lyonston Douglas 25768, d. Auchenbrain Grummie 15th 83005 by Southcraig Footprint 19958.

1488 III. (55.).—H. J. CLARK, Oldner House, Chipping Norton, for Oldner Faith 3rd 32341, born Oct. 6, 1929; s. Carnell Specialist 26471, d. Oldner Faith 8947 by Ickham Mascot 24352.

1492 IV. (54.).—NATIONAL SOCIETY FOR EPILEPTICS, Chalfont Colony, Bucks, for Chalfont Heather 2nd 29961, born Nov. 7, 1929; s. Craigaploch Crusader 27683, d. Rainton Heather 12th 3201 by Carleton Guardsman 18946.

1491 R. N.—EDWARD GREENSHIELDS, Ivy House, East Herrington, Sunderland, for Herrington Caroline.

Guernseys.

N.B.—Unless otherwise stated the numbers refer to the English Guernsey Herd Book.

Class 185.—Guernsey Bulls, born in or before 1928.

1498 I. (515. & Champion.* & Champion.*)—SIR GORDON LEY, BART., Furze Down, King's Somborne, Hants, for Fernhill Rose Lad 6432, fawn and white, born June 6, 1926, bred by Walter Dunkels, Fernhill Park, Windsor Forest; s. Rose Lad of Goodnestone 3163, d. 14281 Downe Fleur of Vimiera by Valentine's Honour of the Passée 3826.

1499 II. (510.).—CAPT. W. J. PEARCE, Willoughby House, Rugby, for Fernhill Rose Lad 3rd 6860, fawn and white, born May 20, 1927, bred by Walter Dunkels, Fernhill Park, Windsor Forest; s. Rose Lad of Goodnestone 3163, d. 14281 Downe Fleur of Vimiera by Valentine's Honour of the Passée 3826.

1497 III. (55.).—DAME ETHEL LOCKE KING, Brooklands, Weybridge, for Shiwa Primrose Quickly's Lad 7519, fawn and white, born May 19, 1928; s. Shiwa Primrose Lad 6007, d. 14843 Tregye Quickly by Ladock Prince Charming 3165.

1501 R. N.—MRS. FRANK SUFFIELD, Badby Lodge Farm, Daventry, for Lily's Climax of Modland.

Class 186.—Guernsey Bulls, born in 1929.

1504 I. (515. R. N. for Champion.* & R. N. for Champion.*)—W. DUNKELS, Fernhill Park, Windsor Forest, for Fernhill Robert 5th 7795, fawn and white, born April 28; s. Hindhead Robert 6th 5847, d. 14281 Downe Fleur of Vimiera by Valentine's Honour of the Passée 3826.

1509 II. (510.).—MRS. EVELYN RICH, Wretham Hall, Thetford, for Lord Roberts 9th of Rusper 7649, fawn and white, born June 26, bred by W. A. Argent, Ghyll Manor, Rusper; s. Lynchmere Lord Roberts 20th 5335, d. 18576 Wintergreen of Goodnestone 10th by Rose Lad of Goodnestone 3163.

1506 III. (55.).—CAPT. C. J. KANE, Kingston Russell House, Long Bredy, Dorchester, for Milton Goldfinder 4th 7838, fawn and white, born May 27, bred by Sir Eric Hambro, Milton Abbey, Blandford; s. Milton Goldfinder 2nd 6780, d. 16570 Hayes Lola 5th by Ladock Prince Albert 3550.

Class 187.—Guernsey Bulls, born in 1930.

1510 I. (515.).—DEBENHAM & TORY, Bladen Farms, Brintspuddle, Dorchester, for Bladen Rose Lad 8401, fawn and white, born May 23, bred by Sir Ernest Debenham, Bart.; s. Milton Rose Lad 7330, d. 14826 Tregothnan Farm Girl by Nicolle's Fleurie Sequel 3378.

¹ Prizes given by the Ayrshire Cattle Herd Book Society.

* Champion Prize of £5 given by the English Guernsey Cattle Society for the best Bull.

† The "Calehill" Silver Challenge Cup given by the English Guernsey Cattle Society for the best Bull.

- 1516 II. (#10).—MRS. J. SUTCLIFFE PYMAN, Norsebury, Sutton Scotney, Hants, for Norsebury Lodestar 11th 5534, fawn and little white, born July 12; s. Sequel's Lodestar 2nd 4932, d. 17880 Hindhead Princess Rosey by Lynchmere Lord Roberts 15th 3952.
- 1513 III. (#5).—DAME ETHEL LOCKE KING, Brooklands House, Weybridge, for Shiva Rosey of Goodnestone's Lad 8365, fawn and white, born May 18; s. Beauty's Lad of the Rouvets 4394, d. 18291 Rosey of Goodnestone 15th by Rose Lad of Goodnestone 3163.
- 1519 IV. (#4).—MRS. DORIS S. L. VERSCHOYLE, Brookhill, Wokingham, for Brookhill Seigneurs Sequence 8339, fawn and white, born April 14; s. Harvester of St. Leddards 7618, d. 28668 Venus 2nd de la Seigneurie by Golden Noble of New Volante 4477 P.S.
- 1518 R. N.—H. B. TURNER, Malverleys, Newbury, for Malverleys King's Fancy.

Class 188.—Guernsey Cows, in-milk, born in or before 1926.

- 1520 I. (#15, Champion,* & Champion.)*—W. DUNKELS, Fernhill Park, Windsor Forest, for 18813 Fernhill Rose, fawn and white, born Aug. 8, 1923, calved June 14, 1931; s. Murrell Desmond 4263, d. 14574 Lynchmere Rose of Kent 5th by Prince of Vimiera 3577.
- 1521 II. (#10).—SIR GORDON LAY, BART., Furze Down, King's Somborne, Hants, for 28174 Melanie of Goodnestone 18th, fawn and white, born Oct. 5, 1925, calved May 24, 1931, bred by Lord FitzWalter, Goodnestone Park, Canterbury; s. Wintergreens Slogan of Goodnestone 5208, d. 19481 Melanie of Goodnestone 16th by Rose Lad of Goodnestone 6th 4592.
- 1522 III. (#5).—H. J. PILBROW, Mapleton, Edenbridge, for 21599 Engew Gentle 4th, fawn and white, born Dec. 11, 1924, calved Feb. 6, 1931, bred by S. Christopher, Engew Farm, Gwithian, Hayle; s. Bladen Cinderella's Prince 4695, d. 17690 Engew Gentle 3rd by Engew Gay Boy 2nd 3696.
- 1524 R. N.—R. M. THORNELY, Elm Grove, Kingsclere, Newbury, for 17282 Batchwood Venus 2nd.

Class 189.—Guernsey Cows or Heifers, in-milk, born in 1927 or 1928.*

- 1533 I. (#15, R. N. for Champion,* & R. N. for Champion.)*—MRS. J. SUTCLIFFE PYMAN, Norsebury, Sutton Scotney, Hants, for 25809 Rosey of Goodnestone 33rd, fawn and white, born Feb. 8, 1927, calved May 17, 1931, bred by Lord FitzWalter, Goodnestone Park, Canterbury; s. Clara's Lad of Kings Mills 6020, d. 20248 Rosey of Goodnestone 22nd by Sequel's Slogan 2nd 4311.
- 1535 II. (#10).—MRS. DORIS S. L. VERSCHOYLE, Brookhill, Wokingham, for 32125 Mulberry's Wonder of Bel Air, fawn and white, born Dec. 11, 1923, calved July 1, 1931, bred by E. B. H. Firth, Sark; s. Argus 2nd of New Place 5401 P.S., d. 21409 P.S. Mulberry of Bel Air 5th by Argus of New Place 4032 P.S.
- 1529 III. (#5).—W. DUNKELS, Fernhill Park, Windsor Forest, for 28077 Fernhill Rose 2nd, fawn and white, born March 28, calved April 20, 1931; s. Hindhead Robert 6th 5847, d. 18813 Fernhill Rose by Murrell Desmond 4263.
- 1527 IV. (#4).—J. H. V. COLLINGS, Manor Farm, Middleton, Bognor Regis, for 28127 Princess 3rd of Cotes aux Monts, fawn and white, born Feb. 2, 1927, calved June 9, 1931, bred by J. Le Messurier, Les Cotes aux Monts, St. Saviours, Guernsey; s. Governor 2nd of Le Frie 5121 P.S., d. 5519 F.S. Princess des Cotes aux Monts.
- 1536 R. N.—MRS. DORIS S. L. VERSCHOYLE, for Violet of Beauregard.
- H. C.—1580.

Class 190.—Guernsey Heifers, born in 1929.

- 1547 I. (#15).—H. B. TURNER, Malverleys, Newbury, for 30426 Malverleys Buttercup, fawn and white, born March 19; s. Moundsmere Honor 6838, d. 20084 Caledhill Valentine by Lynchmere Lord Roberts 15th 3748.
- 1540 II. (#10).—W. DUNKELS, Fernhill Park, Windsor Forest, for 30752 Fernhill Rose 2nd, dark fawn and white, born April 5; s. Hindhead Robert 6th 5847, d. 18813 Fernhill Rose by Murrell Desmond 4263.
- 1537 III. (#5).—W. J. BORLASE, Wootton Manor, Henley-on-Thames, for 31469 Bellhurst Aubepine 3rd, fawn and white, born Aug. 9, bred by F. Strickland & Sons, Bellhurst Farm, Hurst Green, Sussex; s. Bellhurst Cornishman 6531, d. 21059 Bellhurst Aubepine by Lynchmere Lord Roberts 17th 4537.
- 1544 IV. (#4).—MRS. J. SUTCLIFFE PYMAN, Norsebury, Sutton Scotney, Hants, for 30321 Norsebury Buttercup 2nd, fawn and white, born Feb. 11; s. Sequel's Lodestar 2nd 4932, d. 28628 Buttercup 2nd of North View by Winsome's Hero 4507 P.S.
- 1541 R. N.—W. DUNKELS, for Fernhill Victorine 6th.
- H. C.—1542, 1545.

Class 191.—Guernsey Heifers, born in 1930.

- 1550 I. (#15).—W. DUNKELS, Fernhill Park, Windsor Forest, for 32836 Fernhill Fleur 3rd, fawn and white, born March 7; s. Hindhead Robert 6th 5847, d. 14281 Downe Fleur of Vimiera by Valentine's Honour of the Passée 8826.

* Champion Prize of £5 given by the English Guernsey Cattle Society for the best Cow or Heifer.

* The "Fernhill" Silver Challenge Cup given by the English Guernsey Cattle Society for the best Cow or Heifer.

* Prizes, except Fourth, given by the English Guernsey Cattle Society.

oviii *Awards of Live Stock Prizes at Warwick, 1931.*

- 1555 II. (£10).—MRS. J. SUTCLIFFE PYMAN, Narsebury, Sutton Scotney, Hants, for 32775 Narsebury Buttercup 3rd, fawn and white, born Jan. 24; s. Narsebury Noel 6875, d. 23628 Buttercup 2nd of North View by Winsome's Hero 4507.
- 1552 III. (£5).—DAME ETHEL LOCKE KING, Brooklands House, Weybridge, for 32771 Shiwa Majors Neda, fawn and white, born Feb. 2; s. Milton Major 7552, d. 26061 Neda's Queen of the Fountain by Dinah's Nobleman 4990 P.S.
- 1549 IV. (£4).—W. J. BORLASE, Wootton Manor, Henley-on-Thames, for 32871 Wootton Crocus 4th, fawn and white, born March 1; s. Herriard Honour Bright 5661, d. 18707 Tregonning Crocus by Boscreage Surprise 4407.
- 1556 V. (£3).—MRS. EVELYN RICH, Wretham Hall, Thetford, for 32709 Silverstead Honey 4th, fawn and white, born Jan. 3; s. Shiwa Wintergreen's Lad 6369, d. 19984 Silverstead Honey by Tregonning Field Marshal 4054.
- 1551 R. N.—H. A. Y. DYSON, Dalton's, Bolney, Haywards Heath, for Muriel 2nd of Pothill. H. C.—1553, 1561. C.—1557, 1560.

Jerseys.

N.B.—In the Jersey Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Island Herd Book. A number without brackets indicates that the animal is registered in the English Jersey Herd Book.

Class 192.—Jersey Bulls, born in or before 1928.

- 1566 I. (£15, & Champion.¹)—MRS. J. T. WIGAN, Danbury Park, Chelmsford, for Carnatie's Sweep 16537, whole colour, born April 19, 1928, bred by A. W. Ruggles Brise, Spains Hall, Braintree; s. Diamond's Sweep 15968, d. Carnatie's Gift 5th by Minorca's Jolly Sultan 12076.
- 1565 II. (£10, & R. N. for Champion.¹)—H. STEPHEN-FOX, Sharelands, Blackboys, Sussex, for Pioneer's Don Silver 16059, whole colour, born June 30, 1927, bred by Viscount Cowdray, Cowdray Park, Midhurst; s. Groombridge Don Silver 15863, d. Pioneer's Lady by Pioneer's Noble 12416.
- 1562 III. (£5).—MISS R. B. BABCOCK, Shawlands, Lingfield, for Marston Daybreak, whole colour, born March 4, 1928, bred by W. Wilkins, Long Marston, Tring; s. Signalmann 15777, d. Happy Midsummer Dream 7945 by Bindle 14943.
- 1564 R. N.—SIR HAROLD MACKINTOSH, Conyngham Hall, Knaresborough, for Golden Cowalip. H. C.—1563.

Class 193.—Jersey Bulls, born in 1929.

- 1568 I. (£15).—MRS. EVELYN, Wotton House, Dorking, for Wotton Sandpole, whole colour, born May 24; s. Wotton Maypole 16213, d. Wotton Sand Maiden by Wotton Sandy 12814.
- 1567 II. (£10).—MRS. G. J. AUSTIN, Ellern Mede, Totteridge, for Eastwood Essential Savour, whole colour, born June 26, bred by Mrs. Edgar Watts, Eastwood Park, Fairfield, Glos.; s. Mustard Pot 15210, d. Essence Pride 1828 by Mytilda's Beau 14395.
- 1569 III. (£5).—MAJOR A. W. HUNTINGTON, Wellesbourne House, Warwick, for Brave Boy, whole colour, born Jan. 22, bred by L. P. Merhet, St. Saviours, Jersey; s. Bravo 15834, d. Queen's Lady 3rd (25477) by Inkermann Oxford Noble 12996.
- 1572 R. N.—A. ANDERDON WESTON, Holme Grange, Wokingham, for Beuvelande Viscount.

Class 194.—Jersey Bulls, born in 1930.

- 1573 I. (£15).—MRS. G. J. AUSTIN, Ellern Mede, Totteridge, for Unabashed, whole colour, born Feb. 28, bred by H. P. Le Reux, Jersey; s. Sam's Dreamer (6432), d. Abasterina (29920) by Sybil's Beau (5538).
- 1569 II. (£10).—E. A. STRAUSS, Kingston House, Kingston Bagpuize, Abingdon, for Kingston Grand Parade, whole colour, born March 17; s. Conyngham Louis, d. Nuneham Lady 19th by Friday's Glory Lad 14236.
- 1578 III. (£5).—MRS. EVELYN, Wotton House, Dorking, for Wotton Hair, whole colour, born July 18; s. Wotton Airman 2nd 14502, d. Lingen Lucky Connection 9636 by Lingen Calcutta Sweep 15695.
- 1588 IV. (£4).—H. STEPHEN-FOX, Sharelands, Blackboys, Sussex, for Sharelands Don Bradman, whole colour, born May 4; s. Pioneer Don Silver 16059, d. Eastwood Lady Fayre 9189 by The Slasher 14143.
- 1586 V. (£3).—MRS. ANNIE RANGLLEY, Draycote, Rugby, for Toreador, broken colour, born July 22, bred by R. Bruce Ward, Godinton, Ashford, Kent; s. Taillefer 16393, d. Jolly Song 9534 by Groombridge Jolly Boy 15864.
- 1577 R. N.—MRS. DRONSFIELD, Norley Hall, Norley, Frodsham, Cheshire, for Prince Jim.
- 1576 H. C. & Champion.²—MRS. LIONEL CORBETT, Hockey House, Alresford, for Wotton Mascot, dark fawn, born May 8, bred by Mrs. Evelyn, Wotton House, Dorking; s. Wotton Airman 2nd 14502, d. Wotton Esamead 8755 by Charm of War 15279.
- 1584 H. C. & R. N. for Champion.²—MRS. C. J. PHILLIPS, Old Dalby Hall, Melton Mowbray, for Dalby Cassa, whole colour, born July 1, bred by the late C. J. Phillips; s. Cupid 13894, d. Kate Cuslew (imp.) 2088 by The Sweep 14144. H. C.—1585. C.—1581.

¹ Champion Prize of £5 given by the English Jersey Cattle Society for the best Bull.

² The "Meridale" Perpetual Silver Challenge Cup given through the English Jersey Cattle Society for the best yearling Bull from recorded dam.

Class 195.—Jersey Cows, in-milk, born in or before 1927.

- 1611 I. (#15, & Champion.¹)—H. OROIL PELLY, Venars, Nutfield, Surrey, for Flashlight's Josy 6354, broken colour, born Feb. 24, 1925, calved May 4, 1931, bred by J. St. C. Hamon, Trinity, Jersey; s. Flashlight 14993, d. Amy Josy (22735) by Financial Baron 11310.
- 1605 II. (#10).—SIR HAROLD MACKINTOSH, Conyngnam Hall, Knaresborough, for Blondine's Kraska (83845) P.S., broken colour, born Dec. 24, 1927, calved May 19, 1931, bred by A. A. L. Jeanne, St. Martins, Jersey; s. Blondine's Was Wanted 15488, d. Kraska (24691) P.S.H.C. by Corydon (5312) P.S.H.C.
- 1607 III. (#5).—SIR HAROLD MACKINTOSH, for Golden Maid's Light 4925, broken colour, born April 17, 1922, calved May 13, 1931, bred by W. P. Jean, St. Lawrence, Jersey; s. Golden Maid's Double 13591, d. Lily Light 4th (24559) by Blonde's Golden Oxford 12554.
- 1594 IV. (#4).—A. W. BUGGLES BRISE, Spains Hall, Braintree, for Bright Lass 2957, broken colour, born May 30, 1923, calved June 5, 1931; s. Cowdray Hero 13886, d. Bright Eye by Combination 2nd 13644.
- 1596 V. (#3).—MRS. LIONEL CORBETT, Hockley House, Alresford, for Sea Harvest 10057, dark fawn, born Sept. 30, 1926, calved June 12, 1931, bred by P. L. Gregson, Hearts Hill, Loughton; s. Fontaines Oxford Sultan 14284, d. Aquamarine by The Cid 12473.
- 1603 R. N.—SIR JOHN B. LLOYD, Foxbury, Stone Street, Sevenoaks, for Hamletta's Mistress. H. C.—1593, 1595, 1607, 1609, 1610, 1613, 1615, 1619, 1620. C.—1599, 1608.

Class 196.—Jersey Heifers, in-milk, born in 1928.

- 1624 I. (#15, & Special, #5.²)—MRS. G. J. AUSTIN, Ellern Mede, Totteridge, for Ballarina 8855, whole colour, born May 6, calved June 5, 1931; s. Rapallo 15545, d. Raleigh's Beauty 1053 by Raleigh's Jap 2nd 13089.
- 1629 II. (#10, & R. N. for Specials.³)—LADY VIOLET HENDERSON, Buscot Park, Faringdon, for Countess Arkona, broken colour, born Feb. 23, calved May 26, 1931; s. Arkona's Duke 15252, d. Pedro's Young Countess 6930 by Pedro 14733.
- 1626 III. (#5).—E. G. W. BERKELEY, Spetchley Park, Worcester, for Spetchley Adonis, whole colour, born June 22, calved June 29, 1931; s. Arkon 15579, d. Warriors Plymouth Interest 7258 by Sybil's Warriors Prince 14803.
- 1627 IV. (#4).—GROSVENOR BERRY, Mount Bures, Suffolk, for Black Art's Postgirl, whole colour, born March 20, calved April 9, 1931; s. Black Art 15590, d. Postgirl 2nd 6968 by Nimrod 14890.
- 1630 V. (#3).—LADY VIOLET HENDERSON, for Lady Bountiful, broken colour, born March 1, calved May 31, 1931; s. Arkona's Duke 15252, d. War Pay 7255 by Panola's Sultan 14730.
- 1633 R. N.—H. OROIL PELLY, Venars, Nutfield, Surrey, for Kentwings Anchusa. H. C.—1632.

Class 197.—Jersey Heifers, in-milk, born in 1929.³

- 1648 I. (#15, R. N. for Champion.¹ & Special, #10.²)—SIR JOHN B. LLOYD, Foxbury, Stone Street, Sevenoaks, for Valentine's Countess, broken colour, born April 27, calved April 11, 1931; s. Viscount of Oaklands 16688, d. Valentine of La Fontaine 8668 by Dreaming Sultan 14600.
- 1645 II. (#10).—LADY VIOLET HENDERSON, Buscot Park, Faringdon, for Gires, whole colour, born June 22, calved May 13, 1931, bred by Mrs. Carlton, Eastwood, Fairfield, Glos; s. The Slasher 14143, d. Disturbing Charm 6240 by You'll Do's Volunteer 14382.
- 1643 III. (#5).—MRS. EVELYN, Wotton House, Dorking, for Wotton Pride of the Air, whole colour, born April 3, calved May 23, 1931; s. Wotton Airman 2nd 14502, d. Fertile's Pride 4849 by Observer 13682.
- 1642 IV. (#4).—MISS DRONSFIELD, Norley Hall, Norley, Frodsham, Cheshire, for Greystone's Brunette 5th, whole colour, born Jan. 4, calved May 21, 1931, bred by V. C. Le Masurie, St. Owen, Jersey; s. Sybil's Oxford You'll Do (6314), d. Greystones Brunette (23885) by Xenia's Sultan (5578).
- 1649 V. (#3).—SIR HAROLD MACKINTOSH, Conyngnam Hall, Knaresborough, for Conyngnam's Sweet Thyme, whole colour, born April 16, calved June 22, 1931; s. Hussey's Frolic Wonder, d. Lingen Sweet Thyme 3590 by Wotton Vervain's Moonlight 14505.
- 1638 R. N.—E. G. W. BERKELEY, Spetchley Park, Worcester, for Eastwood Jingle. H. C.—1635, 1637, 1639, 1641, 1646, 1647, 1650.

Class 198.—Jersey Heifers, born in 1930.

- 1656 I. (#15).—MRS. EVELYN, Wotton House, Dorking, for Wotton Bella Donna, whole colour, born June 25; s. Bright Eyes Sweep 16529, d. Wotton Desert Morn by Hambury Sunrise 15873.
- 1657 II. (#10).—LADY VIOLET HENDERSON, Buscot Park, Faringdon, for Lovely Lady, broken colour, born March 16; s. Fiery Aristocrat 16280, d. Una by Nimrod's Lion 16043.

¹ Champion Prize of £5 given by the English Jersey Cattle Society for the best Cow or Heifer.

² Special Prizes of £10 (First Prize) and £5 (Second Prize) given by the English Jersey Cattle Society for the best Cows or Heifers in Classes 195 to 197, bred by Exhibitor, and milked out to the Judge's satisfaction before being judged.

³ Prizes, except Fourth and Fifth, given by the English Jersey Cattle Society.

- 1661 III. (#5).—W. HUMPHREYS PRESCOTT, Highlands, Woldingham, Surrey, for *Dovers Posy*, broken colour, born April 23, bred by G. H. Lindsey-Renton, Dovers Green, Reigate; s. *Aldbury Observer* 16508, d. *Dovers Royal Bouquet* 7735 by *Royal Kingdom* 14446.
- 1663 IV. (#4).—H. STEPHEN-FOX, Sharelands, Blackboys, Sussex, for *Sharelands Golden Princess*, whole colour, born Aug. 1; s. *Pioneer Don Silver* 16056, d. *Eastwood Sparkling Cider* 9196 by *The Slasher* 14143.
- 1660 V. (#3).—H. S. MOUNTAIN, Groombridge Place, Kent, for *Thrip's Sweetbrier*, whole colour, born May 18; s. *Thrip*, d. *Sir Laurel's Sweetbread* by *Sir Laurel* 15228.
- 1664 R. N.—E. A. STRAUSS, Kingston House, Kingston Bagpuize, Abingdon, for *Lady Brenda*. H. C.—1653, 1654, 1655, 1659, 1665, 1666.
- Cup.¹—MRS. EVELYN.
- R. N. for Cup.²—LADY VIOLET HENDERSON.

Kerrys.

N.B.—In the Kerry Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Royal Dublin Society's Herd Book. A number without brackets indicates that the animal is registered in the British Kerry Herd Book.

Class 199.—Kerry Bulls, born in or before 1929.

- 1667 I. (#15, & Champion).—MISS P. DE B. F. BOWEN-COLTHERST, The Kerry Cow Dairy Farms, Laver de la Haye, Colchester, for *Valencia Linkman* 496, born April 24, 1919, bred by the Knight of Kerry, Warren House, Stanmore; s. *Valencia Chieftain* 421, d. *Valencia Meta* (4122) by *Valencia Lord* (782).
- 1670 II. (#10).—JOHN WM. TOWLER, Wadlands Hall, Farsley, Leeds, for *Wadlands Butter Monarch* 916, born Sept. 13, 1929; s. *Wadlands Butter Prince* 747, d. *Wadlands Flash Mona* 4274 by *Wadlands Flashpoint* 621.
- 1671 III. (#5).—T. WATTS, Warwick Lodge, Redhill, for *Muckcross Carnera* (1738), born Jan. 1, 1929, bred by A. R. Vincent, Muckcross, Killarney; s. *Bushmount Scumas* (1239), d. *Muckross Castinette* (4748) by *Muckcross Playboy* of the Western World 558.
- 1668 R. N.—W. MOA. HOUSTOUN, Sachel Court, Alford, Billingshurst, for *Hattingley Edgar*.

Class 200.—Kerry Bulls, born in 1930.

- 1672 I. (#15, & R. N. for Champion).—MISS P. DE B. F. BOWEN-COLTHERST, The Kerry Cow Dairy Farms, Laver de la Haye, Colchester, for *Drumgaunagh Shann*, born July 12; s. *Valencia Linkman* 496, d. *Drumgaunagh Kitty* by *Drumgaunagh Victory* 508.
- 1674 II. (#10).—W. MOA. HOUSTOUN, Sachel Court, Alford, Billingshurst, for *Sachel Erin* 908, born July 1; s. *Hattingley Edgar* 801, d. *Shamrock* 2754 F.S.
- 1673 III. (#5).—LAURENCE CURRIE, Minley Manor, Farnborough, for *Minley Laurence* 894, born April 7; s. *Ard Casin Timothy* 751, d. *Minley Duchess* 3413 by *Minley Alexander* 479.
- 1675 R. N.—JOHN WM. TOWLER, Wadlands Hall, Farsley, Leeds, for *Wadlands Flash Beaver*.

Class 201.—Kerry Cows, in-milk, born in or before 1927.

- 1680 I. (#15).—NEWTON R. STEEL, The Hookland Estate, Scaynes Hill, Haywards Heath, for *Muckcross Moscow* 5000, born Aug. 10, 1924, calved April 18, 1931, bred by A. R. Vincent, Muckcross, Killarney; s. *Muckcross Nosegay* (1126), d. *Muckcross Mouskie* (4631) by *Duv Bidd* (784).
- 1681 II. (#10).—JOHN WM. TOWLER, Wadlands Hall, Farsley, Leeds, for *Wadlands Flash Dewdrops* 4823, born June 18, 1926, calved March 7, 1931; s. *Wadlands Flashpoint* 621, d. *Wadlands Drops* 3479 by *Gort Count* 5th 435.
- 1679 III. (#5).—LAURENCE CURRIE, Minley Manor, Farnborough, for *Minley Vera* 4757, born Oct. 10, 1925, calved May 4, 1931; s. *Hattingley Arthur* 588, d. *Minley Matilda* 3621 by *O.P.H. Watersheen Ratmore* 454.
- 1677 R. N.—MISS P. DE B. F. BOWEN-COLTHERST, The Kerry Cow Dairy Farms, Laver de la Haye, Colchester, for *Drumgaunagh Favourite* 2nd.
- H. C.—1682.

Class 202.—Kerry Heifers, in-milk, born in 1928 or 1929.

- 1687 I. (#15).—JOHN WM. TOWLER, Wadlands Hall, Farsley, Leeds, for *Castlough Nymph* 4899, born April 12, 1928, calved June 24, 1931, bred by the late John Hillard, Coolcloher House, Killarney; s. *Munster Leny* 770, d. *Castlough Nita* 2554 by *Castlough Oliver* 431.
- 1685 II. (#10).—LAURENCE CURRIE, Minley Manor, Farnborough, for *Minley Enid*, born April 3, 1928, calved April 30, 1931; s. *Drumgaunagh Black Beauty* 717, d. *Minley Irene* 4587 by *Minley Monarch* 554.
- 1684 III. (#5).—MISS P. DE B. F. BOWEN-COLTHERST, The Kerry Cow Dairy Farms, Laver de la Haye, Colchester, for *Drumgaunagh Mahala* 4920, born Feb. 4, 1928, calved Jan. 8, 1931; s. *Valencia Linkman* 496, d. *Drumgaunagh Mary Ellen* 4335 by *Drumgaunagh Leo* 638.
- 1686 R. N.—JOHN WM. TOWLER, for *Ard Casin Clarissa*.

¹ The "Conyngham" Perpetual Silver Challenge Cup given through the English Jersey Cattle Society for the most points awarded in a combination of entries.

² Silver Challenge Cup given by the British Kerry Cattle Society for the best animal.

Class 203.—Kerry Heifers, not in-milk, born on or between September 1, 1929 and December 31, 1930.¹

- 1695 I. (£15).—T. WAITE, Warwick Lodge, Redhill, for O.P.H. Geathramhadh Queen 4761, born Dec. 9, 1929, bred by Capt. R. E. Palmer, Oaklands Park, Newdigate, Surrey; s. O.P.H. Watersheen Sam 850, d. O.P.H. Watertime Norah 4409 by O.P.H. Waterville Time 610.
 1692 II. (£10).—NEWTON R. STEEL, The Hookland Estate, Scaynes Hill, Haywards Heath, for Hookland Adrea, born March 13, 1930; s. Muckross Jack 897, d. Muckross Eiveleen 4997 by Muckcross Nonsuch 1263.
 1691 III. (£5).—W. MCA. HOUSTOUN, Sachel Court, Alfold, Billingshurst, for Sachel Molly 5063, born April 1, 1930; s. Hattingley Edgar 801, d. Sachel Lismoyle 4799 by Busy Boy of Warren 682.
 1694 R. N.—JOHN WM. TOWLER, Wadlands Hall, Farsley, Leeds, for Ard Casin Rose. H. C.—1690, 1693. C.—1689.

Dexters.

N.B.—In the Dexter Classes, the number inserted within brackets after the name of an animal indicates the number of such animal in the Royal Dublin Society's Herd Book. A number without brackets indicates that the animal is registered in the English Dexter Herd Book.

Class 204.—Dexter Bulls, born in or before 1929.

- 1698 I. (£15, & R. N. for Champion.²)—MRS. ERNEST JOHNSON, Ashton Hayes, Chester, for Grinstead Taxi 1089, born Aug. 6, 1929, bred by Lady Loder, Leonardslee, Horsham; s. Oakridge Evergood 2nd 1014, d. Grinstead Taxus 2nd 8630 by Cobham Clinker 826.
 1697 II. (£10).—MRS. C. M. L. CALVERT, Banwell Castle, Banwell, Somerset, for Banwell Peter 1081, born July 1, 1929; s. Banwell Breeze 993, d. Banwell Pansy 3914 by Banwell Brat 814.
 1699 III. (£5).—LADY LODER, Leonardslee, Horsham, for Grinstead Night Hawk 1068, born April 29, 1929; s. Grinstead Halfpenny 958, d. Grinstead Nightingale 4th 3810 by Brokenhurst Penny 2nd 694.
 1701 R. N.—MAJOR R. JOHNSTONE STERLING, Pympe Manor, Benenden, for Benenden Buttonhole.

Class 205.—Dexter Bulls, born in 1930.

- 1702 I. (£15).—MRS. C. M. L. CALVERT, Banwell Castle, Banwell, Somerset, for Banwell Solomon, born June 3; s. Ratcliffe Goldsmith 976, d. Attington Sal 3727 by Speldhurst Bellows 803.
 1704 II. (£10).—THE REV. E. A. DOUGLAS MORGAN, Trefonen Rectory, Oswestry, for Grinstead Clever, born April 9, bred by Lady Loder, Leonardslee, Horsham; s. Oakridge Evergood 2nd 1014, d. Grinstead Carpatia 3616 by Cobham Clinker 826.
 1705 III. (£5).—MRS. HUMPHREY R. PRELLE, Lyndsays Farm, Ingatstone, for Lyndsays Milky Way, born Oct. 13; s. Wealden Best Man 1078, d. Hookstile Titania 3324 by Bagendon Nonsuch 687.
 1703 R. N.—W. LINDSAY EVERARD, M.P., Manor Farm, Ratcliffe-on-the-Wreake, Leicester, for Ratcliffe Nahum. H. C.—1707. C.—1706.

Class 206.—Dexter Cows, in-milk, born in or before 1927.

- 1715 I. (£15, Champion,² & Champion.³)—MRS. RICHARD MAGOR, Springfield Lyons, Chelmsford, for Lyons Red Lady 3883, red, born May 17, 1926, calved April 26, 1931; s. Bertie of Grinstead 765, d. Bryn Golden Red 2720 by Oakridge Dane 571.
 1709 II. (£10).—MRS. C. M. L. CALVERT, Banwell Castle, Banwell, Somerset, for Wishbone of Exmoor 4159, red, born Jan. 28, 1927, calved May 21, 1931, bred by the Rev. W. W. Joyce, Charles Rectory, Devon; s. Havering Bob Orange 895, d. Merrythought 3332 by Charlemagne 604.
 1716 III. (£5).—MRS. HUMPHREY R. PRELLE, Lyndsays Farm, Ingatstone, for Lyndsays Signal 3485, born Aug. 14, 1924, calved May 13, 1931; s. Grinstead Toreador 788, d. Lyndsays Verbena Signet 3174 by Lyndsays Leopard 745.
 1712 IV. (£4).—MRS. ERNEST JOHNSON, Ashton Hayes, Chester, for Grinstead Watercross 2774, born Nov. 13, 1920, calved Feb. 14, 1931, bred by H. G. Davies, Wales; s. Hever Tim 686, d. Grinstead Wallflower 2521 by Oakridge Swell 530.
 1714 R. N.—LADY LODER, Leonardslee, Horsham, for Grinstead Tropaeolum 2nd. H. C.—1713.

¹ Prizes given by the British Kerry Cattle Society.

² Silver Challenge Cup given by the Dexter Cattle Society for the best animal.

³ Silver Challenge Breeders' Bowl given through the Dexter Cattle Society for the best animal already registered in the Dexter Herd Book, and which is the progeny of sire and dam already registered.

Class 207.—Dexter Heifers, in-milk to first calving, born in 1928 or 1929.

- 1722 I. (£15).—W. LINDSAY EVERARD, M.P., Manor Farm, Ratcliffe-on-the-Wreake, Leicester for Ratcliffe Redwing 4235, red, born June 12, 1928, calved June 14, 1931; s. Ratcliffe Sergeant Michael 942, d. Fillongley Flamingo 3438 by Fillongley Freemason 680.
 1725 II. (£10).—LADY LODER, Leonardslee, Horsham, for Grinstead Duchess 2nd 4200, born March 21, 1929, calved April 12, 1931; s. Oakridge Evergood 2nd 1014, d. Burghclere Duchess 3774 by Cobham Clinker 826.
 1720 III. (£5).—MRS. C. M. L. CALVERT, Banwell Castle, Banwell, Somerset, for Banwell Sal 3rd 4058, born July 19, 1928, calved April 1, 1931; s. Ratcliffe Goldsmith 976, d. Attingham Sal 3727 by Speldhurst Bellows 803.
 1726 IV. (£4).—MRS. HUMPHREY R. PELLY, Lyndsays Farm, Ingatstone, for Magnolia of Lyndsays 4212, born May 16, 1929, calved June 20, 1931, bred by A. Taylor, Fitlock, Cheveley, Newmarket; s. Ratcliffe Pioneer 977, d. Matty 4213 by Lyndsays Matador 963.
 1728 R. N.—MAJOR R. JOHNSTONE STIRLING, Pympe Manor, Benenden, for Benenden Barrow. H. C.—1723.

Class 208.—Dexter Heifers, not in-milk, born in 1929 or 1930.¹

- 1736 I. (£15).—MAJOR R. JOHNSTONE STIRLING, Pympe Manor, Benenden, for Benenden Butterfly 3rd, born July 12, 1929; s. Wells Piper's Son 1056, d. Benenden Butterfly 4072 by Grinstead Dainty Jock 925.
 1729 II. (£10).—MRS. C. M. L. CALVERT, Banwell Castle, Banwell, Somerset, for Banwell Opaline 2nd 4269, red, born May 9, 1930; s. Ratcliffe Goldsmith 976, d. Banwell Opaline 4056 by Brentmoor Bracken 874.
 1734 III. (£5).—MRS. HUMPHREY R. PELLY, Lyndsays Farm, Ingatstone, for Long Cross Judith 4315, born June 20, 1929, bred by Col. Wilson, Long Cross, Sussex; s. Woodland Butterwort 982, d. Jade of Hookstile 2965 F.S.
 1733 R. N.—LADY LODER, Leonardslee, Horsham, for Grinstead Convolvulus 4th. H. C.—1731, 1732.

Milk Yield Classes.

Class 209.—Dairy Shorthorn Cows or Heifers.

- 1063 I. (£15).—THE DUKE OF WESTMINSTER, G.C.V.O., D.S.O., Eaton Home Farm, Aldford, Chester, for 92559 Eaton Nelly Princess 2nd, red and little white, born June 4, 1926, calved June 8, 1931; s. Meadow King 174015, d. 56620 Eaton Nelly Princess by Penwortham Style 165863.
 1062 II. (£10).—J. S. TAYLOR, for Pinkneys Lilian. (See Class 141.)
 1033 III. (£5).—E. UWINS GILLATE, Beresford Manor, Plumpton, Sussex, for 67265 Copsale Maid, red, born May 2, 1924, calved June 14, 1931, bred by P. R. L. Savill, Welford Grange, Rugby; s. Histon Wild Prince 3rd 172496, d. Darlington Maid 9th by Barrington Chief 134987.
 1068 IV. (£4).—TUTON & DEANS, Camerton Hall, Burstwick, Hull, for 103000 Camerton Dairy Maid 2nd, red and little white, born July 2, 1927, calved June 1, 1931; s. Brandsby Count 14th 187637, d. 43635, Keyingham Dairy Maid 13th by Brandsby Royal Prince 154223.

Class 210.—Lincolnshire Red Shorthorn Cows or Heifers.

- 1143 I. (£15).—FRANK SAINSBURY, for Southern Charm. (See Class 147.)
 1132 II. (£10).—JOHN EVENS & SON, Burton, Lincoln, for Broxholme Recorder, born May 21, 1922, calved March 18, 1931, bred by H. Sutton, Broxholme, Lincoln; s. Burton Tingle 14318, d. Retford Recorder 2nd by Burton Grove 14307.

Class 212.—Red Poll Cows or Heifers.

- 1216 I. (£15).—CAPT. ALAN RICHARDSON, for Sevensprings Quinine. (See Class 159.)
 1218 II. (£10).—LEUT.-COL. SIR MERRIK R. BURRELL, BART., C.B.E., Knepp Castle, Horsham, for 37352 Knepp Prudence 7th, born May 6, 1926, calved May 13, 1931; s. Knepp Hindoo 13094, d. 31346 Knepp Prudence 5th by Sudbourne Ken 11232.
 1217 III. (£5).—THE EARL OF STRADBROKE, Henham Hall, Wangford, Beccles, Suffolk, for 30189 Manor Bountiful, born May 22, 1921, calved May 10, 1931, bred by the Countess of Stradbroke, Henham Hall; s. Henham Dairyman 11379, d. 23108 Manor Bluebell by Antrim 9769.
 1223 IV. (£4).—LORD CRANWORTH, for Grundisburgh Wanderer. (See Class 160.)
 1237 V. (£3).—MRS. M. M. FITZGERALD, for 87998 Marsden Mimulus, born July 4, 1926, calved Feb. 21, 1931; s. Marsden Mars 13501, d. 32899 Marsden Musk Rose by Answick Russett King 12203.

Class 213.—Blue Albion Cows or Heifers.

- 1294 I. (£15).—P. DOBSON, for Ringwood of Ridgewood. (See Class 166.)

¹ Prizes given by the Dexter Cattle Society.

- 1295 II. (£10.)—W. E. GLOVER, The Shrubberies, Snarestone, Burton-on-Trent, for Pike Dandy 10508, born Nov. 23, 1925, calved June 22, 1931, bred by J. D. Seals, Snelston, Ashbourne; s. Sundial Early Bird 781, d. Bradbourne Darkie 938.
 1293 III. (£5.)—P. DOBSON, for Rene, of Ridgwardine, born in Jan. 1928, calved June 8, 1931.
 1299 E. N.—CAPT. STANLEY SMITH, O.B.E., Southfields, Coleshill, Birmingham, for Park Selina.

Class 214.—British Friesian Cows or Heifers.

- 1360 I. (£15, & Champion.)—E. G. BARTON, for Chaddesley Hedge Rose 2nd. (See Class 174.)
 1371 II. (£10, & E. N. for Champion.)—E. G. BARTON, for Saundby Patricia 120992, born May 11, 1927, calved June 2, 1931; s. Routh Dutchman 6939 P.I., d. Chaddesley Patricia 59916 by Routh Doris 12603.
 1364 III. (£5.)—T. E. GLADSTONE, for Royds Glossia. (See Class 174.)
 1369 IV. (£4.)—MISS E. MARTIN SMITH, Grange Court, Portington, Howden, Yorks, for Duchess Peggy 44624, born Nov. 20, 1920, calved June 3, 1931, bred by E. J. Gilders, Duchess Farm, Clacton-on-Sea; s. Terling Trotter 7079, d. Duchess Favourite 2nd 20776 by Coppins Goldfinder 1127.
 1361 V. (£3.)—CAPT. JOHN CHRISTIE, M.C., for Glyndebourne Rik Lettice. (See Class 174.)

Class 215.—Ayrshire Cows or Heifers.

- 1469 I. (£15, & E. N. for Champion.)—DAVID WALLACE, Mauchline, Auchrain Mayflower 10th 9873, born Oct. 20, 1925, calved June 19, 1931; s. Auchrain Royal Blood 17544, d. Auchrain Mayflower 9th 57340 by Auchrain Sunlight 15832.
 1447 II. (£10.)—H. J. CLARK, for Oldner Maggie. (See Class 182A.)
 1462 III. (£5.)—A. W. MONTGOMERIE, Lessnessock, Ochiltree, Ayrshire, for Pickens Nannie 3689, born Feb. 22, 1925, calved June 17, 1931, bred by James Picken, Torrs, Kirkcudbright; s. Netherton Mazeppa 17227, d. Townhead Nancy 2nd A 8411 by Bargower Factor 13826.
 1467 IV. (£4.)—CLEMMENT E. TORY, Higher Burton House, Dorchester, for Muston Lucy 11776, born Oct. 16, 1926, calved June 17, 1931; s. Howie's Cherry Tree 28738, d. East Newton Lucy 3rd 96114 by Rowallan Bright Lad 21786.

Class 216.—Guernsey Cows or Heifers.

- 1522 I. (£15.)—H. J. PILBROW, for Engew Gentle 4th. (See Class 188.)
 1521 II. (£10.)—SIR GORDON LEY, BART., for Melanie of Goodnestone 18th. (See Class 188.)
 1527 III. (£5.)—J. H. V. COLLINGS, for Princess 3rd of Cotes aux Monts. (See Class 188.)

Class 217.—Jersey Cows or Heifers.

- 1620 I. (£15, Champion, & Champion.)—E. A. STRAUSS, Kingston House, Kingston Bagpuize, Abingdon, for Bush 8897, whole colour, born Jan. 28, 1927, calved March 15, 1931, bred by Dr. H. Watney, Buckhold, Pangbourne; s. Coon 15618, d. Blond 5988 by Gull 14866.
 1599 II. (£10, & E. N. for Champion.)—MRS. EVELYN, Wotton House, Dorking, for Wotton Moonlit Sands 7320, whole colour, born June 19, 1925, calved May 2, 1931; s. Henbury Moonlight 13301, d. Wotton Sand Maiden by Wotton Sandy 12814.
 1611 III. (£5.)—H. CECIL PELLY, for Flashlight's Joey. (See Class 195.)
 1627 IV. (£4.)—GROSVENOR BERRY, for Black Art's Postgirl. (See Class 196.)
 1613 V. (£3.)—MRS. C. J. PHILLIPS, Old Dalby Hall, Melton Mowbray, for Dalby O.K. 7673, broken colour, born April 7, 1927, calved April 25, 1931, bred by the late G. J. Phillips; s. Culverden Pioneers' Oyster 14852, d. Kate Curlew (imp.) 2088 by The Sweep 14144.
 1608 E. N.—LADY STYRES MONSELL, C.B.E., Dumbleton Hall, Evesham, for Accordian 3rd. E. C.—1592, 1597, 1603, 1605, 1609, 1639.

Class 218.—Kerry Cows or Heifers.

- 1677 I. (£15, Champion, & Champion.)—MISS P. DE B. F. BOWEN-COLTHURST, The Kerry Cow Dairy Farms, Laver de la Haye, Colchester, for Drumsnaunagh Favourite 2nd 4519, born Feb. 2, 1924, calved April 18, 1931; s. Drumsnaunagh Victory 508, d. Drumsnaunagh Fortune 2589 by Castle Lough Tommy 795.

¹ Champion Prize of £20, with £5 to the Reserve Number, given by a Society interested in the production of milk for the Cows obtaining the highest number of points in the Dairy Shorthorn, Lincolnshire Red Shorthorn, Red Poll, Blue Albion, and British Friesian Milk Yield Competitions.

² Champion Prize of £20, with £5 to the Reserve Number, given by a Society interested in the production of milk for the Cows obtaining the highest number of points in the Ayrshire, Guernsey and Jersey Milk Yield Competitions.

³ Special Prize of £10 10s. given by the Royal Jersey Agricultural Society for the Jersey Cow gaining the highest number of points.

⁴ Champion Prize of £10, with £5 to the Reserve Number, given by a Society interested in the production of milk for the Cows obtaining the highest number of points in the Kerry and Dexter Milk Yield Competitions.

⁵ The "Elmhurst" Perpetual Silver Challenge Cup given by the British Kerry Cattle Society for the Kerry Cow gaining the highest number of points.

- 1680 II. (#10, R. N. for Champion,¹ R. N. for Champion,² & R. N. for Champion,³)—NEWTON R. STEEL, for Mukroos Moscow. (See Class 201.)
 1681 III. (#5, Champion,¹)—JOHN WM. TOWLER, for Wadlands Flash Dewdrops. (See Class 201.)

Class 219.—Dexter Cows or Heifers.

- 1710 I. (#15, & Champion,⁴)—A. J. CREED, Goldcote House, Stratford-on-Avon, for Wightwick Dolly 2nd 4042, born June 1, 1924, calved April 14, 1931, bred by Miss Dora Box, Lower Farm, Darlingscote, Shipston-on-Stour; s. Wightwick Prince 899, d. Wightwick Dolly 3205 by Oakridge Pat 678.
 1719 II. (#10, & R. N. for Champion,⁴)—MRS. T. H. PEYTON, Colomendy, Mold, for Gaynes Gay 3800, born March 14, 1925, calved May 11, 1931, bred by the Hon. Gerald Wellesley and the Hon. Mrs. Duberly; s. Cobham Blacksmith 727, d. La Mancha 112 235 F.S.
 1714 III. (#5).—LADY LODGE, Leonardslee, Horsham, for Grinstead Tropaeolum 2nd 3813, born Aug. 23, 1926, calved June 23, 1931; s. Grinstead Fred 926, d. Grinstead Tropaeolum 3489 by Brokenhurst Penny 2nd 694.
 1709 R. N.—MRS. C. M. L. CALVERT, for Wishbone of Exmoor. (See Class 206.)

Butter Tests.

Class 220A.—Cows exceeding 900 lb. live weight.

- 1620 I. (#15, & G. M.⁵)—E. A. STRAUSS, for Hush. (See Class 217.)
 1613 II. (#10, & S. M.⁵)—MRS. C. J. PHILLIPS, for Dalby O.K. (See Class 217.)
 1599 III. (#5, & B. M.⁵)—MRS. EVELYN, for Wotton Moonlit Sands. (See Class 217.)
 1132 IV. (#4).—JOHN EVENS & SON, for Broxholms Recorder. (See Class 210.)
 1611 V. (#3).—H. OCEIL PELLY, for Flashlight's Joey. (See Class 195.)
 1610 R. N. & C. M.⁵—H. S. MOUNTAIN, Groombridge Place, Kent, for Cantestwell's Berthe. H. C.—1447. C.—1803.
 Certificates of Merit.⁶—1603, 1605, 1639.

Class 220B.—Cows not exceeding 900 lb. live weight.

- 1597 I. (#15).—MRS. EVELYN, Wotton House, Dorking, for Fancy Edna 7834, whole colour, born July 17, 1926, calved March 29, 1931, bred by C. J. Quenault, Jersey; s. The Mighty Owl 15450, d. Fair Edna (24389) by Fairy General 12609.
 1608 II. (#10).—LADY EYRES MONSELL, C.B.E., Dumbleton Hall, Evesham, for Accordion 3rd 7343, whole colour, born Aug. 6, 1926, calved April 15, 1931; s. New Moon 14062, d. Music 4th by Moonraker 13038.
 1627 III. (#5).—GROSVENOR BERRY, for Black Art's Postgirl. (See Class 196.)
 1639 R. N.—GROSVENOR BERRY, for Excess Postage. H. C.—1605.

GOATS.⁷

Class 221.—Toggenburg or British Toggenburg Female Goats, in-milk, any age.

- 1742 I. (#5, & Champion,⁸ & R. N. for Champion,⁹)—MISS POPE, Bashley Lodge, New Milton, Hants, for Layland Pearl 8203, British Toggenburg, born June 10, 1927, kidded May 11, 1931, bred by Miss Turner; s. Fryston Sprigg 620, d. Ridgeway Ring o' Roses 7068 by Didgemere Daniel 5955.
 1739 II. (#3, & R. N. for Champion,⁹)—MRS. BRUCE FARRER, The Grange, Kenninghall, Norwich, for Hargrave Saintomer 9383, British Toggenburg, born May 19, 1929, kidded April 12, 1931; s. Fryston Sprigg 620, d. Marye 472 by Farham.

¹ Champion Prize of £10, with £5 to the Reserve Number, given by a Society interested in the production of milk for the Cows obtaining the highest number of points in the Kerry and Dexter Milk Yield Competitions.

² The "Elmhurst" Perpetual Silver Challenge Cup given by the British Kerry Cattle Society for the Kerry Cow gaining the highest number of points.

³ Silver Medal given through the British Kerry Cattle Society for the Kerry Cow yielding the highest percentage of Butter Fat, with a minimum of 4 per cent.

⁴ Perpetual Silver Challenge Cup given by the Dexter Cattle Society for the Dexter Cow gaining the highest number of points.

⁵ Gold Medal (or £10 in money), Silver Medal and Bronze Medal given by the English Jersey Cattle Society for the three Jersey Cows obtaining the greatest number of points in the Butter Tests.

⁶ Certificates of Merit given by the English Jersey Cattle Society for Jersey Cows, not being Prize Winners, obtaining the following points: Cows four years old and under, 30; Cows over four years old, 35.

⁷ £30 towards these prizes were given by the British Goat Society.

⁸ Breed Challenge Certificate given by the British Goat Society for the best British Toggenburg Female Goat, over 2 years old.

⁹ Challenge Certificate for the best Dual Purpose Goat, over 2 years old, that has borne a kid.

- 1740 III. (22).—MISS GRESLEY HALL, Craycombe House, Pershore, for Webb Lively 8275, British Toggenburg, born April 29, 1927, kidded April 17, 1931; s. Priest of Bashley 6926, d. Webb Leonora 7247 by Carpenter 528.

- 1741 R. N.—MRS. R. K. MORCOM, Clock House, Bromsgrove, for Cornish Jubbe.

Class 222.—Saanen or British Saanen Female Goats, in-milk, any age.

- 1753 I. (25, Champion,¹ Champion,² & Champion.³)—MISS K. PELLY, Theydon Place, Epping, for Broxbourne Lady May 8456, British Saanen, born March 3, 1927, kidded Feb. 9, 1931, bred by Mr. Hughes, Broxbourne, Herts; s. Broxbourne Gold 62, d. Broxbourne Fairy May 3801 by Leazes Hackle 372.

- 1747 II. (23, & R. N. for Champion.⁴)—J. R. EGERTON, Malpas Cottage, Rushmere, Ipswich, for Ridgeway Robbials 151, British Saanen, born Feb. 25, 1929, kidded Feb. 23, 1931, bred by Mrs. Hope Maurice, Wide Woods, Ewhurst, Surrey; s. Ridgeway Runli 8711, d. Ridgeway Regepyrin 65 by Ridgeway Rip Van Winkle 87.

- 1750 III. (22).—MRS. R. K. MORCOM, Clock House, Bromsgrove, for Cornish Cassandra 9391, British Saanen, born April 15, 1929, kidded March 6, 1931; s. Priest of Bashley 6926, d. Cornish Sybil 7481 by Ridgeway Ramunculus 5528.

- 1744 IV. (21).—J. R. EGERTON, for Malpas Meadowsweet 150, British Saanen, born Feb. 18, 1929, kidded March 6, 1931; s. Fransham Ferdinand 8062, d. Theydon Perfection 45 by Ridgeway Rumpelstiltskin 6536.

- 1754 R. N.—MISS FORB, Bashley Lodge, New Milton, Hants, for Mostyn Mandoline. E. C.—1748.

Class 223.—Anglo-Nubian Female Goats, in-milk, any age.

- 1755 I. (25, & Champion.⁴)—MISS K. PELLY, Theydon Place, Epping, for Theydon Almeda 1768, born April 6, 1926, kidded Jan. 23, 1931; s. Theydon Banjo 1574, d. Theydon Almond 1444 by Edenbreck Klito 947.

- 1758 II. (23, & R. N. for Champion.⁴)—MISS K. PELLY, for Theydon Briar 1910, born March 20, 1928, kidded Feb. 5, 1931; s. Theydon Barber 1803, d. Theydon Belvia 1739 by Theydon Bendigo 1709.

Class 224.—British Alpine Female Goats, in-milk, any age.

- 1764 I. (25, & Champion.⁴)—MRS. ROGER WETHERED, Cherry Tree Cottage, Upper Boddington, Rugby, for Didgemere Deluxe 9146, born April 12, 1929, kidded June 19, 1931, bred by Mrs. Arthur Abbey, Didgemere Hall, Roydon; s. Didgemere Doctor 8436, d. Didgemere Delysia 7714 by Didgemere Daniel 6955.

- 1761 II. (23, & R. N. for Champion.⁴)—MISS C. CHAMBERLAIN, Westons, Lyndhurst, Hants, for Whimsy of Westons 9012, born Feb. 23, 1929, kidded March 10, 1931; s. Didgemere Angus 7161, d. Whimsical of Westons 7051 by Didgemere Dictator 6816.

- 1762 III. (22).—MRS. G. M. SOAMES, Long Buckby Wharf, Rugby, for Pythley Dolly 7783, born May 25, 1926, kidded Feb. 10, 1930; s. Priest of Bashley 6926, d. Wire Mill Della 4708 by Professor of Bashley 6926.

Class 225.—Female Goats, in-milk, any age, any other variety.

- 1769 I. (25, R. N. for Champion.⁵ & R. N. for Champion.⁶)—MISS K. PELLY, Theydon Place, Epping, for Theydon Pauline 8509, British, born Feb. 6, 1928, kidded March 29, 1931; s. Ridgeway Rodrigo 8126, d. Theydon Pensive 6988 by Ridgeway Rumpelstiltskin 6536.

- 1772 II. (23).—MRS. ROGER WETHERED, Cherry Tree Cottage, Upper Boddington, Rugby, for Didgemere Delgada 8829, British, born March 4, 1928, kidded April 12, 1931, bred by Mrs. Arthur Abbey, Didgemere Hall, Roydon, Essex; s. Didgemere Doctor 8436, d. Didgemere Deebee 5966 by Prophet of Bashley 3775.

- 1771 III. (22).—MRS. G. M. SOAMES, Long Buckby Wharf, Rugby, for Pythley Corona 8247, British, born July 1, 1927, kidded Feb. 8, 1930; s. Priest of Bashley 6926, d. Mayfield Carmen 2538 by Cherub.

- 1770 R. N.—MISS FORB, Bashley Lodge, New Milton, Hants, for Proof of Bashley.

Class 226.—Toggenburg, British Toggenburg, Saanen or British Saanen Goatslings over 1 but not exceeding 2 years old.

- 1775 I. (25, & Champion.⁷)—J. B. EGERTON, Malpas Cottage, Rushmere, Ipswich, for Malpas Melody 155, British Saanen, born March 10, 1930; s. Heddon Solan 106, d. Ridgeway Romneys 13 by Ridgeway Ramunculus 5528.

¹ Challenge Certificate for the best Dual Purpose Goat, over 2 years old, that has borne a kid.

² Breed Challenge Certificate given by the British Goat Society for the best British Saanen Female Goat, over 2 years old.

³ Challenge Certificate given by the British Goat Society for the best Female Goat over 2 years old that has borne a kid.

⁴ Breed Challenge Certificate given by the British Goat Society for the best Anglo-Nubian Female Goat, over 2 years old.

⁵ Breed Challenge Certificate given by the British Goat Society for the best British Alpine Female Goat, over 2 years old.

⁶ Bronze Medal given by the British Goat Society for the best Female Goat.

⁷ Bronze Medal given by the British Goat Society for the best Goatsling.

- 1774 II. (23.)—MISS C. CHAMBERLAIN, Westons, Lyndhurst, Hants, for *Wakeful of Westons* 9558, British Toggenburg, born March 8, 1930; s. Raydon Pickle 9232, d. Wistful of Westons 4641 by Edenstead Pluck 3007.
 1776 III. (22.)—MISS BRUCE FARRER, The Grange, Kenninghall, Norwich, for *Danecroft Dancer* 161, British Saanen, born Feb. 22, 1930, bred by Mrs. Lewis Marton, The Bungelow, Clavering, Newport, Essex; s. Playwright of Bashley 114, d. Ridgeway Rima 86.
 1779 R. N.—MRS. R. K. MORCOM, Clock House, Bromsgrove, for *Cornish Goodness*.
 H. C.—1778.

Class 227.—Anglo-Nubian Goatlings, over 1 but not exceeding 2 years old.

- 1781 I. (25, & R. N. for Champion.)—MISS K. PELLY, Theydon Place, Epping, for *Theydon Bella* 2019, born March 15, 1930; s. Theydon Bertrano 1725, d. Theydon Bella 1909 by Ramhurst Corker 1799.
 1782 II. (23.)—MISS K. PELLY, for *Theydon Bride* 2040, born March 29, 1930; s. Theydon Bertrano 1725, d. Theydon Briar 1910 by Theydon Barber 1808.
 1790 III. (22.)—MISS K. PELLY, for *Juliette of Coltishall* 2063, born May 5, 1930, bred by Mrs. Howden, Coltishall, Norfolk; s. Theydon Bertrano 1725, d. Ramhurst Judy 1823 by Wells Plutus 1729.

Class 228.—Goatlings, any other variety, over 1 but not exceeding 2 years old.

- 1784 I. (25.)—MISS C. CHAMBERLAIN, Westons, Lyndhurst, Hants, for *Whin of Westons* 9784, British Alpine, born May 8, 1930; s. Didgemere Angus 7161, d. Whimsical of Westons 7051 by Didgemere Dictator 6816.
 1789 II. (23.)—MRS. R. K. MORCOM, Clock House, Bromsgrove, for *Cornish Oriole* 9526, Anglo-Nubian-Swiss, born Jan. 24, 1930; s. Leazes Kicksy Wicksy 5944, d. Cornish Magpie 5658 by Doochfour Wilfred.
 1787 III. (22.)—MRS. ESTYNN-JONES, Mabbitt's Horn, Ludlow, for *Fransham Pandora* 9650, British, born March 23, 1930, bred by Mrs. R. St. V. Bagnall, Little Fransham, Dereham; s. Didgemere Dragonfly 8526, d. Atherstone Pandora 4751.
 1792 IV. (21.)—MRS. ROGER WETHERED, Cherry Tree Cottage, Upper Boddington, Rugby, for *Boddington Lily* 9523, British, born Jan. 20, 1930; s. Ridgeway Rip Van Winkle 87, d. Lightwater Delight 7987 by Ridgeway Raymond.
 1788 R. N.—MRS. G. M. SOAMES, Craycombe House, Pershore, for *Pytchley Diana*.
 H. C.—1785.

Class 229.—Female Kids, any variety, not over 1 year old.

- 1794 I. (25.)—J. R. EGBERTON, Malpas Cottage, Rushmere, Ipswich, for *Malpas Mimi* 223, British Saanen, born Feb. 22, 1931; s. Heddon Solan 106, d. Theydon Perfection 45 by Ridgeway Rumpelstiltskin 6586.
 1802 II. (23.)—MRS. G. M. SOAMES, Long Buckby Wharf, Rugby, for *Pytchley Jangle* 10069, British, born Feb. 26, 1930; s. Pytchley Carol 7671, d. Pytchley Jazzy 9198 by Ridgeway Riddle 8123.
 1798 III. (22.)—MRS. R. K. MORCOM, Clock House, Bromsgrove, for *Cornish Dazzler* 10037, Anglo-Nubian-Swiss, born Jan. 27, 1931; s. Pleaser of Bashley 9571, d. Didgemere Daystar 7173 by Didgemere Duncan 5556.
 1803 IV. (21.)—MRS. G. M. SOAMES, for *Pytchley Tit-bit* 140, British Alpine, born April 6, 1931; s. Malpas Maximilian 99, d. Pytchley Twinkle 93 by Atherstone Dynamite 6171.
 1804 R. N.—MRS. G. M. SOAMES, for *Pytchley Treasure*.
 H. C.—1795, 1801.

Milk Yield Classes.

Class 230.—Milk Yield Class, Quality, open to animals entered in Classes 221 to 225.

- 1753 I. (25, & (with 1781) Champion.)—MISS K. PELLY, for *Broxbourne Lady May*. (See Class 222.)
 1742 II. (23.)—MISS POPE, for *Layland Pearl*. (See Class 221.)
 1769 III. (22, & (with 1782) R. N. for Champion.)—MISS K. PELLY, for *Theydon Pauline*. (See Class 225.)
 1770 IV. (21.)—MISS POPE, for *Proof of Bashley* 8487, British, born Jan. 31, 1928, kidded June 23, 1931; s. Feltham Asterus 8117, d. Problem of Bashley 3076 by Proud 2853.
 1748 V. (10a.)—J. R. EGBERTON, Rushmere, Ipswich, for *Worlington Wavy* 133, British Saanen, born Feb. 25, 1929, kidded April 17, 1931, bred by Mrs. Clayton Swan, Poulton Grange, Cirencester; s. Springfield Fortuity 88, d. Ridgeway Ringlet 8124 by Ridgeway Rip Van Winkle 87.
 1744 R. N., & Champion.)—J. R. EGBERTON, for *Malpas Meadowsweet*. (See Class 222.)

¹ Bronze Medal given by the British Goat Society for the best Goating.

² The "Dewar" Challenge Cup given through the British Goat Society for the exhibitor showing a Female Goat in-milk, and a Goating, under certain conditions.

³ The "Chamberlain" Challenge Cup given by the British Goat Society for the Saanen or British Saanen Goat gaining the highest number of points in Inspection and Milking. The goat must be bred by exhibitor, entered in the Saanen or British Saanen section of the Herd Book, and have obtained an award in the Inspection Class.

1761 Champion.¹—MISS C. CHAMBERLAIN, for Whimsey of Westons. (See Class 224.)
H. C.—1739, 1741, 1750, 1752, 1754, 1768.

Class 231.—Milk Yield Class, Quantity, open to animals entered in Classes 221 to 225.

1753 I. (£5).—MISS K. PELLY, for Broxbourne Lady May. (See Class 222.)
1742 II. (£3).—MISS POPE, for Layland Pearl. (See Class 221.)
1769 III. (£2).—MISS K. PELLY, for Theydon Pauline. (See Class 225.)
1748 IV. (£1).—J. R. EGERTON, for Worlington Wavey. (See Class 230.)
1770 V. (10s).—MISS POPE, for Proof of Bashley. (See Class 230.)
1744 R. N.—J. R. EGERTON, for Malpas Meadowsweet.
H. C.—1739, 1754, 1768.

SHEEP.

Oxford Downs.

Class 232.—Oxford Down Shearling Rams.

1809 I. (£10), 1806 II. (£5), and 1808 IV. (£2).—HUGH W. STILGOS, The Grounds, Adderbury, Banbury.
1813 III. (£3).—G. H. WILLIS, Birdlip, Gloucester, for Birdlip Awake 12227, bred by W. H. Hitch, Elkstone Manor, Cheltenham.
1805 R. N.—E. G. CLIFFORD, Manley Farm, Quenington, Fairford, Glos.
H. C.—1811.

Class 233.—Oxford Down Ram Lambs.

1819 I. (£10).—HOBBS & DAVIS, Kelmescott, Lechlade, Glos.
1821 II. (£5).—S. C. WAKEFIELD, Langford Downs, Lechlade, Glos.
1820 III. (£3).—HUGH W. STILGOS, The Grounds, Adderbury, Banbury.
1822 IV. (£2).—W. F. G. WATTS, Elsfield, Oxford.
1818 R. N.—MAJOR R. F. FULLER, Great Chalfield, Melksham, Wilts.
H. C.—1816. C.—1815.

Class 234.—Three Oxford Down Ram Lambs.

1827 I. (£10, Champion.² & Champion.³)—HOBBS & DAVIS, Kelmescott, Lechlade, Glos.
1824 II. (£5, & R. N. for Champion.⁴)—LAWRENCE B. AKERS, Litchfield Farm, Enstone, Oxford.
1831 III. (£3).—W. F. G. WATTS, Elsfield, Oxford.
1828 IV. (£2).—HUGH W. STILGOS, The Grounds, Adderbury, Banbury.
1830 R. N.—S. C. WAKEFIELD, Langford Downs, Lechlade, Glos.
H. C.—1826. C.—1823.

Class 235.—Three Oxford Down Shearling Ewes.

1832 I. (£10, R. N. for Champion.⁵ & Champion.⁶)—HUGH W. STILGOS, The Grounds, Adderbury, Banbury.
1833 II. (£5).—W. F. G. WATTS, Elsfield, Oxford.
1834 III. (£3).—G. H. WILLIS, Birdlip, Gloucester, for ewes, bred by T. Rich & Son, Aldeworth, Cheltenham.

Class 236.—Three Oxford Down Ewe Lambs.

1842 I. (£10, & R. N. for Champion.⁷)—W. F. G. WATTS, Elsfield, Oxford.
1839 II. (£5).—HOBBS & DAVIS, Kelmescott, Lechlade, Glos.
1836 III. (£3).—LAWRENCE B. AKERS, Litchfield Farm, Enstone, Oxford.
1837 R. N.—E. G. CLIFFORD, Manley Farm, Quenington, Fairford, Glos.
H. C.—1836, 1838. C.—1840.

¹ The "Abbey" Challenge Cup given through the British Goat Society for the British Alpine Goat gaining the highest number of points in Inspection and Milking. The goat must be bred by exhibitor, entered in the British Alpine section of the Herd Book, and have obtained an award in the Inspection Class.

² The "Chalfield" Silver Challenge Cup given through the Oxford Down Sheep Breeders' Association for the best Male exhibit.

³ The "Northwick" Silver Challenge Cup given through the Oxford Down Sheep Breeders' Association for the best exhibit.

⁴ The "Broadwell" Silver Challenge Plate given through the Oxford Down Sheep Breeders' Association for the best Female exhibit.

Shropshires.

Class 237.—*Shropshire Shearling Rams.*

- 1853 I. (£10, Champion,¹ & Champion.²)—E. CRAIG TANNER, Eyton-on-Severn, Wroxeter Shrewsbury.
 1847 II. (£5, R. N. for Champion,¹ & R. N. for Champion.²)—WILLIAM EVERALL, Shrawardine Castle, Shrewsbury.
 1851 III. (£3.)—N. J. NUNNERLEY, Ternhill House, Market Drayton.
 1844 IV. (£2.)—MRS. BRIAN BIBBY, Sansaw, Shrewsbury.
 1850 R. N.—JOHN MINTON, Dryton, Wroxeter, Shrewsbury.

Class 238.—*Shropshire Ram Lambs.*

- 1856 I. (£10.)—WILLIAM EVERALL, Shrawardine Castle, Shrewsbury.
 1859 II. (£5.)—J. N. RITCHIE, Tern, Wellington, Shropshire.
 1858 III. (£3.)—N. J. NUNNERLEY, Ternhill House, Market Drayton.
 1857 R. N.—MRS. INGE, Thorpe, Tamworth.

Class 239.—*Three Shropshire Shearling Rams.*³

- 1869 I. (£10.)—E. CRAIG TANNER, Eyton-on-Severn, Wroxeter, Shrewsbury.
 1866 II. (£5.)—JOHN MINTON, Dryton, Wroxeter, Shrewsbury.
 1864 III. (£3.)—WILLIAM EVERALL, Shrawardine Castle, Shrewsbury.
 1867 IV. (£2.)—N. J. NUNNERLEY, Ternhill House, Market Drayton.
 1868 R. N.—J. N. RITCHIE, Tern, Wellington, Shropshire.

Class 240.—*Three Shropshire Ram Lambs.*

- 1875 I. (£10.)—J. N. RITCHIE, Tern, Wellington, Shropshire.
 1872 II. (£5.)—WILLIAM EVERALL, Shrawardine Castle, Shrewsbury.
 1874 III. (£3.)—N. J. NUNNERLEY, Ternhill House, Market Drayton.
 1876 R. N.—E. CRAIG TANNER, Eyton-on-Severn, Wroxeter, Shrewsbury.

Class 241.—*Three Shropshire Shearling Ewes.*

- 1878 I. (£10.)—MRS. BRIAN BIBBY, Sansaw, Shrewsbury.
 1879 II. (£5), and 1880 III. (£3.)—MRS. INGE, Thorpe, Tamworth.
 1877 R. N.—LIEUT.-COL. E. C. ATKINS, Stretton House, Stretton Baskerville, Hinckley.

Class 242.—*Three Shropshire Ewe Lambs.*

- 1887 I. (£10.)—J. N. RITCHIE, Tern, Wellington, Shropshire.
 1888 II. (£5.)—E. CRAIG TANNER, Eyton-on-Severn, Wroxeter, Shrewsbury.
 1883 III. (£3.)—MRS. BRIAN BIBBY, Sansaw, Shrewsbury.
 1884 R. N.—WILLIAM EVERALL, Shrawardine Castle, Shrewsbury.

Southdowns.

Class 243.—*Southdown Two Shear Rams.*

- 1891 I. (£10, Champion,⁴ & Champion.⁵)—JOHN LANGMEAD, Northwood, Ford, Arundel, for Ford 16 of 1929 20018.
 1895 II. (£5.)—J. PIERPONT MORGAN, Wall Hall, Watford, for Aldenham 557 of 1929.
 1890 III. (£3.)—SIR JEREMIAH COLMAN, BART., Gatton Park, Surrey, for Gatton Park G. 193.
 1894 R. N.—J. PIERPONT MORGAN, for Aldenham 553 of 1929.

Class 244.—*Southdown Shearling Rams.*

- 1908 I. (£10, & R. N. for Champion⁴), and 1909 V. (£1.)—J. PIERPONT MORGAN, Wall Hall, Watford.
 1902 II. (£5.)—SIR JEREMIAH COLMAN, BART., Gatton Park, Surrey.
 1906 III. (£3), and 1907 R. N.—LADY LUDLOW, Luton Hoo, Luton.
 1904 IV. (£2.)—JOHN LANGMEAD, Northwood, Ford, Arundel, Sussex.
 G.—1897.

¹ Champion Silver Medal given by the Shropshire Sheep Breeders' Association for the best Ram in Classes 237 and 238.

² The "Hardwicke" Perpetual Silver Challenge Cup, given through the Shropshire Sheep Breeders' Association, for the best exhibit.

³ Prizes, except Fourth, given by the Shropshire Sheep Breeders' Association.

⁴ Champion Gold Medal, or £10 10s. in cash, given by the Southdown Sheep Society for the best Ram in Classes 243 and 244.

⁵ The "Northumberland" Perpetual Silver Challenge Cup given through the Southdown Sheep Society for the best exhibit.

Class 245.—Three Southdown Shearling Rams.¹

- 1916 I. (£10, & R. N. for Champion.²)—LADY LUDLOW, Luton Hoo, Luton.
 1915 II. (£5.)—JOHN LANGMEAD, Northwood, Ford, Arundel.
 1911 III. (£3.)—HIS MAJESTY THE KING, Sandringham, Norfolk.
 1917 R. N.—J. PIERPONT MORGAN, Wall Hall, Watford.
 C.—1912, 1913.

Class 246.—Three Southdown Ram Lambs.

- 1927 I. (£10.)—WALTER LANGMEAD, Wicks, Yapton, Arundel.
 1929 II. (£5.)—J. PIERPONT MORGAN, Wall Hall, Watford.
 1926 III. (£3.)—JOHN LANGMEAD, Northwood, Ford, Arundel.
 1919 IV. (£2.)—HIS MAJESTY THE KING, Sandringham, Norfolk.
 1932 V. (£1.)—SIR SIDNEY WISHART, Church Farm, Binsted, Arundel.
 1928 R. N.—LADY LUDLOW, Luton Hoo, Luton.
 H. C.—1930. C.—1922, 1923.

Class 247.—Three Southdown Shearling Ewes.

- 1938 I. (£10, & Champion.³)—JOHN LANGMEAD, Northwood, Ford, Arundel.
 1940 II. (£5.)—J. PIERPONT MORGAN, Wall Hall, Watford.
 1939 III. (£3.)—LADY LUDLOW, Luton Hoo, Luton.
 1936 R. N.—SIR JEREMIAH COLEMAN, BART., Gatton Park, Surrey.
 H. C.—1935. C.—1934.

Class 248.—Three Southdown Ewe Lambs.

- 1948 I. (£10, & R. N. for Champion.³)—JOHN LANGMEAD, Northwood, Ford, Arundel.
 1949 II. (£5.)—WALTER LANGMEAD, Wicks, Yapton, Arundel.
 1951 III. (£3.)—J. PIERPONT MORGAN, Wall Hall, Watford.
 1954 IV. (£2.)—SIR SIDNEY WISHART, Church Farm, Binsted, Arundel.
 1950 V. (£1.)—LADY LUDLOW, Luton Hoo, Luton.
 1941 R. N.—HIS MAJESTY THE KING, Sandringham, Norfolk.
 H. C.—1944. C.—1945.

Hampshire Downs.

Class 249.—Hampshire Down Shearling Rams.

- 1963 I. (£10), and 1964 IV. (£2.)—THE EXORS. OF THE LATE JAMES GOLDSMITH, Blendworth, Horndean, Cosham, Hants, for rams, bred by James Goldsmith, Blendworth.
 1956 II. (£5.)—J. H. BENYON, Englefield House, Reading, for Englefield Account I 487.
 1965 III. (£3.)—MAJOR AND MRS. JERVOISE, Herriard Park, Basingstoke.
 1961 V. (£1), and 1960 R. N.—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks.
 H. C.—1955, 1966. C.—1957, 1958, 1959.

Class 250.—Hampshire Down Ram Lambs.

- 1970 I. (£10), and 1971 IV. (£2.)—MAJOR V. S. BLAND, The Warren, Aldbourne, Marlborough.
 1977 II. (£5.)—A. THOMAS LOYD, Lockinge House, Wantage.
 1975 III. (£3.)—MAJOR AND MRS. JERVOISE, Herriard Park, Basingstoke.
 H. C.—1974.

Class 251.—Three Hampshire Down Ram Lambs.

- 1983 I. (£10, & Champion.⁴)—THE EXORS. OF THE LATE JAMES GOLDSMITH, Blendworth, Horndean, Cosham, Hants.
 1980 II. (£5.)—MAJOR V. S. BLAND, The Warren, Ashbourne, Marlborough.
 1984 III. (£3.)—MAJOR AND MRS. JERVOISE, Herriard Park, Basingstoke, Hants.
 H. C.—1985.

Class 252.—Three Hampshire Down Shearling Ewes.

- 1986 I. (£10.)—J. H. BENYON, Englefield House, Reading.
 1990 II. (£5), and 1989 R. N.—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks.
 1988 III. (£3.)—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.

Class 253.—Three Hampshire Down Ewe Lambs.

- 1993 I. (£10, & R. N. for Champion.⁴)—MAJOR V. S. BLAND, The Warren, Aldbourne, Marlborough.

¹ Prizes given by the Southdown Sheep Society.

² The "Northumberland" Perpetual Silver Challenge Cup given through the Southdown Sheep Society for the best exhibit.

³ Champion Silver Medal, or £1 in cash, given by the Southdown Sheep Society for the best Pen of Ewes or Ewe Lambs.

⁴ Champion Prize of £10 given by the Hampshire Down Sheep Breeders' Association for the best exhibit.

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- 1992 II. (#5).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 1994 III. (#3).—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks.
 1991 R. N.—J. H. BENYON, Englefield House, Reading.
 H. C.—1996, 1997. C.—1995, 1998.

Suffolks.

Class 254.—*Suffolk Two Shear Rams.*

- 2000 I. (#10, & Champion.¹)—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket, for Foxearth Jim 21148, bred by Ewer & Pawsey, Clay Pits, Foxearth, Long Melford.
 2001 II. (#5).—LONDON COUNTY COUNCIL, HOLLESLEY BAY LABOUR COLONY, Hollesley, Woodbridge, for Walton Fingeringhoe Eagle 21252, bred by J. W. & F. D. Eagle, Walton-on-Naze, Essex.
 2003 III. (#3).—W. O. STEELE, Kinwarton, Alcester, for Hannams Sunbeam 21410, bred by F. W. Clarke, Great Bromley, Essex.

Class 255.—*Suffolk Shearling Rams.*

- 2010 I. (#10).—STUART PAUL, Kirton Lodge, Ipswich, for Colony Derby, bred by the Hollesley Bay Labour Colony, Hollesley, Woodbridge.
 2012 II. (#5).—SIR PRINCE PRINCE-SMITH, BART., Southburn House, Driffield.
 2005 III. (#3).—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket, for Stetchworth Boxer.
 2004 IV. (#2).—MAJOR R. L. BARCLAY, C.B.E., Higham, Bury St. Edmunds, for Higham Superior End.
 H. C.—2011.

Class 256.—*Suffolk Ram Lambs.*

- 2016 I. (#10).—EWER & PAWSEY, Clay Pits, Foxearth, Long Melford, Suffolk.
 2020 II. (#5).—JOHN R. KEEBLE & SON, Brantham Hall, Manningtree, Essex.
 2018 III. (#3).—G. A. GOODCHILD, Great Yeldham Hall, Great Yeldham, Essex.
 2015 IV. (#2).—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket.
 2023 V. (#1).—SIR PRINCE PRINCE-SMITH, BART., Southburn House, Driffield.
 2021 R. N.—LONDON COUNTY COUNCIL, HOLLESLEY BAY LABOUR COLONY, Hollesley, Woodbridge.

Class 257.—*Three Suffolk Ram Lambs.²*

- 2036 I. (#10, & R. N. for Champion.¹)—FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill.
 2032 II. (#5).—JOHN R. KEEBLE & SON, Brantham Hall, Manningtree, Essex.
 2030 III. (#3).—G. A. GOODCHILD, Great Yeldham Hall, Great Yeldham, Essex.
 2028 IV. (#2).—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket.
 2034 R. N.—STUART PAUL, Kirton Lodge, Ipswich.

Class 258.—*Three Suffolk Shearling Ewes.*

- 2040 I. (#10).—LONDON COUNTY COUNCIL, HOLLESLEY BAY LABOUR COLONY, Hollesley, Woodbridge.
 2043 II. (#5).—FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill.
 2039 III. (#3).—MAJOR R. L. BARCLAY, C.B.E., Higham, Bury St. Edmunds.

Class 259.—*Three Suffolk Ewe Lambs.*

- 2054 I. (#10).—FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill.
 2048 II. (#5).—G. A. GOODCHILD, Great Yeldham Hall, Great Yeldham, Essex.
 2047 III. (#3).—EWER & PAWSEY, Clay Pits, Foxearth, Long Melford, Suffolk.
 2046 IV. (#2).—THE EARL OF ELLESMERE, Stetchworth Park, Newmarket.
 2051 R. N.—LONDON COUNTY COUNCIL, HOLLESLEY BAY LABOUR COLONY, Hollesley, Woodbridge.
 Cup.³—FRANK SAINSBURY.
 R. N. for Cup.³—THE EARL OF ELLESMERE.

¹ Perpetual Challenge Plate and £5 in cash given by the Suffolk Sheep Society for the best exhibit.

² Prizes, except Fourth, given by the Suffolk Sheep Society.

³ The "Southburn" Silver Challenge Cup given through the Suffolk Sheep Society for the most points awarded in a combination of entries.

Dorset Horns.

Class 263.—*Two Dorset Horn Ram Lambs, born on or after October 1, 1930.*¹

2058 I. (£10), and 2059 II. (£5).—W. RUPERT TORY, Clenstone Manor, Blandford.
2056 III. (£3).—DEBENHAM & TORY, Anderson, Blandford.

Class 264.—*Two Dorset Horn Shearling Ewes, born on or after October 1, 1929.*

2062 I. (£10), and 2063 II. (£5).—W. RUPERT TORY, Clenstone Manor, Blandford.
2061 III. (£3).—E. G. HEAL, Newclose Farm, Thorley, Yarmouth, Isle of Wight.

Class 265.—*Two Dorset Horn Ewe Lambs, born on or after October 1, 1930.*

2067 I. (£10), and 2068 II. (£5).—W. RUPERT TORY, Clenstone Manor, Blandford.
2066 III. (£3).—E. G. HEAL, Newclose Farm, Thorley, Yarmouth, Isle of Wight.
2065 R. N.—DEBENHAM & TORY, Anderson, Blandford.

Wiltshire or Western Horns.

Class 266.—*Wiltshire or Western Horn Rams, Two Shear and upwards.*²

2069 I. (£10, & Champion.³)—C. E. GILBY, Spratton, Northampton, for Brookhall Conquest 2440, born in 1929, bred by Brodie Bros., Brockhall, Weedon.
2073 II. (£5).—W. B. SOUTHERNWOOD, Gubblicote, Tring, for Gubblicote Range, born in 1929.
2070 III. (£3).—JERMAN & THOMAS, Penyrorsedd Cemlyn, Cemaes Bay, Anglesey, for Cemlyn Caesar 2511, born in 1929, bred by W. R. Jerman, Penyrorsedd Cemlyn.
2072 R. N.—JERMAN & THOMAS, for Cemlyn Champion.

Class 267.—*Wiltshire or Western Horn Shearling Rams.*

2077 I. (£10).—JERMAN & THOMAS, Penyrorsedd Cemlyn, Cemaes Bay, Anglesey, for Brookhall Druid 2666, bred by Brodie Bros., Brockhall, Weedon.
2076 II. (£5).—A. GOWLING, Snowford Hall, Leamington Spa, for Upton Romeo, bred by S. K. Spokes, Upton Lodge, Northampton.
2078 III. (£3).—WILLIAM MORRIS, Tarry Lane, Yelvertoft, Rugby, for Brookhall Dandy, bred by Brodie Bros., Brockhall, Weedon.
2075 R. N.—A. GOWLING, for Snowford Rambler.

Class 268.—*Two Wiltshire or Western Horn Shearling Ewes.*

2083 I. (£10, & R. N. for Champion.⁴), and 2084 III. (£3).—A. GOWLING, Snowford Hall, Leamington Spa.
2086 II. (£5).—W. B. SOUTHERNWOOD, Gubblicote, Tring.
2081 R. N.—H. ATTERBURY, Sharley Cop, Ravensthorpe.

Ryelands.

Class 269.—*Ryeland Rams, Two Shear and upwards.*

2089 I. (£10, & R. N. for Champion.⁴)—DAVID J. THOMAS, Monachty, Abergavenny, for Thomas's Memento 2797, bred in 1929.
2087 II. (£5).—W. L. HORBURY, Ettington Park, Stratford-on-Avon, for Clytha Typefounder 2256, born in 1928, bred by the late Mrs. Herbert-Huddleston, Clytha Park, Abergavenny.
2089 III. (£3).—WALTER WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Marriage Hill Juryman 2560, born in 1928.

Class 270.—*Ryeland Shearling Rams.*

2095 I. (£10, Champion,⁴ & Champion.⁵)—WALTER WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Airedale Eager 2662, bred by W. H. Humphreys, Weald Manor, Airedale.
2091 II. (£5, & R. N. for Champion.⁴)—W. L. HORBURY, Ettington Park, Stratford-on-Avon, for Ettington Excelsior.

¹ Prizes given by the Dorset Horn Sheep Breeders' Association.

² Prizes given by the Wiltshire or Western Horn Sheep Society.

³ Silver Challenge Cup given by the Wiltshire or Western Horn Sheep Society for the best exhibit.

⁴ Champion Silver Gilt Medal given by the Ryeland Flock Book Society for the best Male exhibit.

⁵ Silver Challenge Cup given through the Ryeland Flock Book Society for the best Shearling Ram.

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- 2090 III. (£3).—W. L. HORBURY, for *Ettington Eric*.
2096 R. N.—WALTER WOOLLAND, for *Marriage Hill Cadet*.

Class 271.—Three Ryeland Ram Lambs.

- 2101 I. (£10).—WALTER WOOLLAND, Baydon Manor, Ramsbury, Marlborough.
2100 II. (£5).—DAVID J. THOMAS, Monachty, Abergavenny.
2098 III. (£3), and 2099 R. N.—W. L. HORBURY, Ettington Park, Stratford-on-Avon.

Class 272.—Three Ryeland Shearling Ewes.

- 2105 I. (£10, & Champion.¹)—WALTER WOOLLAND, Baydon Manor, Ramsbury, Marlborough.
2103 II. (£5).—W. L. HORBURY, Ettington Park, Stratford-on-Avon.
2102 III. (£3).—DEBENHAM & TOBY, Anderson, Blandford.

Class 273.—Three Ryeland Ewe Lambs.

- 2108 I. (£10, & R. N. for Champion.¹)—WALTER WOOLLAND, Baydon Manor, Ramsbury Marlborough.
2107 II. (£5).—W. L. HORBURY, Ettington Park, Stratford-on-Avon.

Kerry Hill (Wales).

Class 274.—Kerry Hill (Wales) Rams, Two Shear and upwards.

- 2109 I. (£10, & R. N. for Champion.²)—MISS R. B. BARCOCK, Shawlands, Lingfield, for *Welshpool Daulmer* 14738, born in 1928, bred by Cyril Alderson, Welshpool.
2116 II. (£5).—THOMAS WILLIAMS, The Gaer, Forden, Welshpool, for *Stockley Motto* 15600, born in 1929, bred by J. W. Owens, The Moors, Presteign.
2110 III. (£3).—MISS R. B. BARCOCK, for *Staunton Masterpiece* 15558, born in 1929, bred by R. Edwards & Son, Staunton Old Court, Pembridge.
2111 R. N.—JOHN T. BEAVAN, Winsbury, Chirbury, Mont., for *Stormer Favourite*.
H. C.—2113. C.—2114.

Class 275.—Kerry Hill (Wales) Shearling Rams.

- 2122 I. (£10, & Champion.²)—SIR DAVID R. LLEWELLYN, BART., The Court, St. Fagans, for *St. Fagans Freeman*.
2126 II. (£5).—THOMAS WILLIAMS, The Gaer, Forden, Welshpool, for *Gaer Lion*.
2123 III. (£3).—H. C. PILKINGTON, Bryntanat, Llansantffraid, Mont., for *Tanatside Jackdaw*.
2120 R. N.—J. N. KENDALL, Brimsfield Park, Glos, for *Brimsfield Highwayman*.
H. C.—2125. C.—2117.

Class 276.—Kerry Hill (Wales) Ram Lambs.

- 2131 I. (£10).—J. N. KENDALL, Brimsfield Park, Glos.
2141 II. (£5).—THOMAS WILLIAMS, The Gaer, Forden, Welshpool, for *Gaer Master*.
2128 III. (£3).—JOHN T. BEAVAN, Winsbury, Chirbury, Mont., for *Winsbury Nobby*.
2129 IV. (£2).—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry, for *Brogyntyn Albert*.
2136 V. (£1).—H. C. PILKINGTON, Bryntanat, Llansantffraid, Mont., for *Tanatside Kismet*.
2133 R. N.—SIR DAVID R. LLEWELLYN, BART., The Court, St. Fagans.
H. C.—2130, 2138, 2139. C.—2132, 2140.

Class 277.—Three Kerry Hill (Wales) Shearling Ewes.

- 2143 I. (£10).—JOHN T. BEAVAN, Winsbury, Chirbury, Mont.
2147 II. (£5).—SIR DAVID R. LLEWELLYN, BART., The Court, St. Fagans.
2148 III. (£3).—H. C. PILKINGTON, Bryntanat, Llansantffraid, Mont.
2146 R. N.—L. LETHGOW, The Manor House, Shawell, Rugby.
H. C.—2142. C.—2144.

Class 278.—Three Kerry Hill (Wales) Ewe Lambs.³

- 2152 I. (£10).—JOHN T. BEAVAN, Winsbury, Chirbury, Mont.
2153 II. (£5).—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry.
2159 III. (£3).—THOMAS WILLIAMS, The Gaer, Forden, Welshpool.
2156 IV. (£2).—SIR DAVID R. LLEWELLYN, BART., The Court, St. Fagans.
2157 R. N.—H. C. PILKINGTON, Bryntanat, Llansantffraid, Mont.
H. C.—2151.

¹ Champion Silver Gilt Medal given by the Ryeland Flock Book Society for the best Female exhibit.

² Silver Challenge Cup, given through the Kerry Hill (Wales) Flock Book Society for the best exhibit.

³ Prizes, except Fourth, given by the Kerry Hill (Wales) Flock Book Society.

Clun Forests.

Class 279.—Clun Forest Rams, Shearling and upwards.

- 2160 I. (£10).—T. E. BASON, Broughton Farm, Montgomery, for Broughton Finder 1332, born in 1929.
 2163 II. (£5).—H. J. MARSH, Manor House Farm, Bedstone, Bucknell, Shropshire, for Bedstone Gem, born in 1930.
 2167 III. (£3).—MRS. DOROTHY M. B. SPEAKMAN, Stagbatch House, Leominster, for Billy of Lawton Bury, born in 1930, bred by W. R. Lyke, Lawton Bury, Leominster.
 2162 IV. (£2).—W. R. LYKE, Lawton Bury, Leominster, for Beau of Lawton Bury, born in 1930.
 2161 R. N.—T. E. BASON, for Broughton Gaffer.

Class 280.—Three Clun Forest Shearling Ewes.¹

- 2172 I. (£10).—H. J. MARSH, Manor House Farm, Bedstone, Bucknell, Shropshire.
 2170 II. (£5).—H. T. JONES, Mynde Farm, Bedstone, Bucknell, Shropshire.
 2171 III. (£3).—W. R. LYKE, Lawton Bury, Leominster.
 2174 R. N.—MAJOR H. R. SYKES, Lydham Manor, Bishop's Castle, Shropshire.

Lincolns.

Class 281.—Lincoln Two Shear Rams.

- 2176 I. (£10).—ERNEST ADDISON, Riby Grange, Stallingborough, Lincs, for Riby Champion 2nd.
 2178 II. (£5).—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs, for Well Star.
 2179 III. (£3).—MAJOR W. H. RAWNSLEY, for Well Triumph.
 2177 R. N.—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs, for Horkstow Manor No. 1 of 1929.

Class 282.—Lincoln Shearling Rams.

- 2182 I. (£10, & Champion²), 2181 II. (£5, & R. N. for Champion²), and 2180 III. (£3).—ERNEST ADDISON, Riby Grange, Stallingborough, Lincs.
 2187 R. N.—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs.

Class 283.—Three Lincoln Shearling Rams.

- 2188 I. (£10).—ERNEST ADDISON, Riby Grange, Stallingborough, Lincs.
 2195 II. (£5).—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs.
 2191 III. (£3).—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.

Class 284.—Three Lincoln Ram Lambs.

- 2196 I. (£10).—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
 2195 II. (£5).—ERNEST ADDISON, Riby Grange, Stallingborough, Lincs.
 2197 III. (£3).—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs.

Class 285.—Three Lincoln Ewe Lambs.

- 2198 I. (£10).—ERNEST ADDISON, Riby Grange, Stallingborough, Lincs.
 2199 II. (£5).—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
 2200 III. (£3).—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs.

Border Leicesters.

Class 290.—Border Leicester Rams, Two Shear and upwards.

- 2206 I. (£10, & Champion³).—JAMES HOWIE, JR., Eglinton Mains, Irvine, Ayrshire, for Sandyknowe Rising Sun 8899, born in 1929, bred by Thos. & Matthew Templeton, Sandyknowe, Kelso.
 2205 II. (£5).—CHARLES H. DYCKIE, Wooperton, Northumberland, for Duplex 7915, born in 1923, bred by James Howie, Hillhouse, Kilmarnock.
 2201 III. (£3).—ROBERT CROSS, Knockdon, Maybole, for Southern Cross 8926, born in 1929.

¹ Prizes given by the Clun Forest Sheep Breeders' Association.

² Champion Prize of £5 given by the Lincoln Longwool Sheep Breeders' Association for the best Ram in Classes 281 and 282.

³ Perpetual Silver Challenge Cup and Gold Medal given by the Society of Border Leicester Sheep Breeders for the best exhibit.

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Class 291.—Border Leicester Shearling Rams.

- 2210 I. (£10).—A. B. HOWIE, Eshott Brocks, Felton, Morpeth, for *Howie's Standard* 8765, bred by James Howie & Sons, Muirside, Hollywood, Dumfries.
2209 II. (£5).—ROBERT CROSS, Knockdon, Maybole.
2212 III. (£3).—JAMES HOWIE, JR., Eglinton Mains, Irvine, Ayrshire, for *Perfect Piece* 8863.
2211 R. N.—A. B. HOWIE.

Class 292.—Border Leicester Ewes, Two Shear and upwards.¹

- 2218 I. (£10).—JAMES HOWIE, JR., Eglinton Mains, Irvine, Ayrshire, for ewe, born in 1925, bred by John Stewart, Saughland, Tynehead.
2217 II. (£5).—ROBERT CROSS, Knockdon, Maybole, for ewe, born in 1929.

Class 293.—Border Leicester Shearling Ewes.

- 2221 I. (£10, & R. N. for Champion.²)—ROBERT CROSS, Knockdon, Maybole.
2222 II. (£5).—A. B. HOWIE, Eshott Brocks, Felton, Morpeth.

Wensleydales.

Class 294.—Wensleydale Rams, Two Shear and upwards.

[No Exhibits.]

Class 295.—Wensleydale Shearling Rams.

- 2233 I. (£10, & Champion.³)—JOHN W. GREENSIT, Holme-on-Swale, Thirsk, for ram, bred by John Hargrave, Wath, Ripon.

Class 296.—Three Wensleydale Shearling Rams.

- 2240 I. (£10).—JOHN W. GREENSIT, Holme-on-Swale, Thirsk.

Class 297.—Wensleydale Shearling Ewes.

- 2243 I. (£10).—JOHN W. GREENSIT, Holme-on-Swale, Thirsk.

Class 298.—Wensleydale Yearling Ewes, shown in wool.⁴

- 2249 I. (£10).—JOHN W. GREENSIT, Holme-on-Swale, Thirsk.

Kent or Romney Marsh.

Class 299.—Kent or Romney Marsh Two-Shear Rams.

- 2251 I. (£10).—J. EGERTON QUESTED, The Firs, Cheriton, Kent, for *Quested's No. 237 of 1929* 70938.
2252 II. (£5).—J. EGERTON QUESTED, for *Quested's No. 458 of 1929* 71012.
2253 III. (£3).—ASHLEY STEVENS, Davington Hall, Faversham, for *Luddenham No. 129 of 1929* 71490.

Class 300.—Kent or Romney Marsh Shearling Rams.

- 2258 I. (£10, & Champion⁵), and 2260 V. (£1).—J. EGERTON QUESTED, The Firs, Cheriton, Kent.
2254 II. (£5, & R. N. for Champion⁵), and 2255 IV. (£2).—E. W. BAKER, Parsonage Farm, Bekesbourne, Canterbury.
2261 III. (£3).—ASHLEY STEVENS, Davington Hall, Faversham.
2256 R. N.—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
H. C.—2257, 2266.

Class 301.—Three Kent or Romney Marsh Shearling Rams.⁶

- 2273 I. (£20), and 2271 III. (£10).—J. EGERTON QUESTED, The Firs, Cheriton, Kent.
2275 II. (£15), and 2274 R. N.—ASHLEY STEVENS, Davington Hall, Faversham.
2268 IV. (£5).—E. W. BAKER, Parsonage Farm, Bekesbourne, Canterbury.
H. C.—2270. G.—2273.

¹ Prizes given by the Society of Border Leicester Sheep Breeders.

² Perpetual Silver Challenge Cup and Gold Medal given by the Society of Border Leicester Sheep Breeders for the best exhibit.

³ Silver Challenge Trophy and Gold Medal to the Breeder given by the Wensleydale Long-wool Sheep Breeders' Association for the best exhibit.

⁴ Prizes given by the Wensleydale Longwool Sheep Breeders' Association.

⁵ Champion Prize of £10 10s. given by the Kent or Romney Marsh Sheep Breeders' Association for the best Ram in Classes 299 and 300.

⁶ Prizes given by the Kent or Romney Marsh Sheep Breeders' Association.

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Class 302.—Three Kent or Romney Marsh Ram Lambs.

- 2280 I. (£10), and 2281 III. (£3).—J. EGERTON QUESTED, The Firs, Cheriton, Kent.
2278 II. (£5).—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
2282 R. N.—ASHLEY STEVENS, Davington Hall, Faversham.

Class 303.—Three Kent or Romney Marsh Shearling Ewes.

- 2283 I. (£10, & Champion.¹)—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
2284 II. (£5), and 2285 III. (£3).—J. EGERTON QUESTED, The Firs, Cheriton, Kent.
2286 R. N.—ASHLEY STEVENS, Davington Hall, Faversham.

Class 304.—Three Kent or Romney Marsh Ewe Lambs.

- 2287 I. (£10, & R. N. for Champion.)¹—CLIFFORD NICHOLSON, Worlaby House, Brigg, Lincs.
2288 II. (£5), and 2289 III. (£3).—J. EGERTON QUESTED, The Firs, Cheriton, Kent.
2290 R. N.—ASHLEY STEVENS, Davington Hall, Faversham.

South Devons.

Class 305.—South Devon Shearling Rams.

- 2291 I. (£10), and 2292 R. N.—W. C. BICE & SON, Nanswhychen, St. Columb, Cornwall.
2293 II. (£5).—H. WHITLEY, Primley House, Paignton.
2294 III. (£3).—JOHN HOARE & SON, Mount Barton, Staverton, Totnes, for Hoare's No. 1 of 1930 23047.
H. C.—2293.

Class 306.—South Devon Ram Lambs.²

- 2299 I. (£10).—WILLIAM HAWKE, Besoughan, Colan, St. Columb, Cornwall.
2298 II. (£5).—W. C. BICE & SON, Nanswhychen, St. Columb, Cornwall.
2302 III. (£3).—H. WHITLEY, Primley House, Paignton.
2300 R. N.—JOHN HOARE & SON, Mount Barton, Staverton, Totnes, for Hoare's No. 1 of 1931.

Class 307.—South Devon Shearling Ewes.

- 2303 I. (£10).—JOHN N. GROSE, Penare, Gorran, Cornwall.
2304 II. (£5).—WILLIAM HAWKE, Besoughan, Colan, St. Columb, Cornwall.
2305 III. (£3).—JOHN HOARE & SON, Mount Barton, Staverton, Totnes.

Dartmoors.

Class 308.—Dartmoor Rams, Shearling and upwards.

- 2309 I. (£10).—RICHARD P. LUCE, Lower Chaddlehanger, Tavistock, for Chaddlehanger Hobby 5508, born in 1930.
2308 II. (£5).—RICHARD P. LUCE, for Chaddlehanger Hero 3606, born in 1930.
2310 III. (£3).—W. H. NEAL, Walreddon Farm, Tavistock, for Chaddlehanger Hall 4297, born in 1930, bred by R. P. LUCE, Lower Chaddlehanger, Tavistock.
2306 R. N.—GEORGE GLANFIELD, West Lake, Okehampton, for West Lake.

Class 309.—Dartmoor Shearling Ewes.

- 2312 I. (£10).—W. H. NEAL, Walreddon Farm, Tavistock.
2313 II. (£5).—GEORGE GLANFIELD, West Lake, Okehampton.

Cheviots.

Class 310.—Cheviot Rams, Two Shear and upwards.

- 2315 I. (£10).—JOHN ROBSON, Newton, Tarsat, Northumberland, for Goodenough, born in 1928, bred by Geo. Linton, Parkhead, Dunbar.
2314 II. (£5).—GEOFFREY ROBSON, Closehill, Tarsat, Northumberland, for Inverlyde, born in 1929, bred by John Robson, Millknowe, Duns.
2317 III. (£3).—JOHN N. WALDY, Netherton Burnfoot, Thropton, Morpeth, for Will Fyfe born in 1929.
2316 R. N.—JOHN ROBSON, JR., Lynegar, Watten, Caithness, for Lynegar Mammoth.

¹ Champion Prize of £10 10s., given by the Kent or Romney Marsh Sheep Breeders' Association for the best Fen of Ewes or Ewe Lambs.

² Prizes given by the South Devon Flock Book Association.

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Class 311.—Cheviot Shearling Rams.

- 2320 I. (£10).—JOHN ROBSON, JR., Lynegar, Watten, Caithness.
2319 II. (£5).—JOHN ROBSON, Newton, Tarsset, Northumberland.
2318 III. (£3).—GEOFFREY ROBSON, Closehill, Tarsset, Northumberland.
2321 R. N.—JOHN N. WALDY, Netherton Burnfoot, Thropton, Morpeth.

Class 312.—Cheviot Shearling Ewes.

- 2323 I. (£10).—JOHN ROBSON, Newton, Tarsset, Northumberland.
2322 II. (£5).—GEOFFREY ROBSON, Closehill, Tarsset, Northumberland.
2324 III. (£3).—JOHN ROBSON, JR., Lynegar, Watten, Caithness.
2325 R. N.—JOHN N. WALDY, Netherton Burnfoot, Thropton, Morpeth.

Welsh Mountain.

Class 313.—Welsh Mountain Rams, Two-Shear and upwards.¹

- 2331 I. (£10).—MAJOR ERIC J. W. PLATT, Madryn Farm, Aber, Caernarvonshire, for Madryn A.20 3280, born in 1928.
2327 II. (£5).—LIEUT.-COL. E. W. GRIFFITH, Plasnewydd, Trefnant, Denbighshire, for Plasnewydd Mr. Jinks 8426, born in 1929.
2330 III. (£3).—MAJOR ERIC J. W. PLATT, for Madryn A.3 3223, born in 1928.
2332 R. N.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber, Caernarvonshire, for Snowdon A.14.
H. C.—2323. G.—2326.

Class 314.—Welsh Mountain Shearling Rams.

- 2334 I. (£10).—LIEUT.-COL. E. W. GRIFFITH, Plasnewydd, Trefnant, Denbighshire, for Plasnewydd Bismheim.
2337 II. (£5), and 2338 R. N.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber, Caernarvonshire.
2336 III. (£3).—MAJOR ERIC J. W. PLATT, Madryn Farm, Aber, Caernarvonshire.
H. C.—2335.

Class 315.—Welsh Mountain Ram Lambs.

- 2344 I. (£10).—MAJOR ERIC J. W. PLATT, Madryn Farm, Aber, Caernarvonshire.
2345 II. (£5), and 2346 R. N.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber.
2340 III. (£3).—LIEUT.-COL. E. W. GRIFFITH, Plasnewydd, Trefnant, Denbighshire.
H. C.—2339. G.—2341, 2342, 2343.

Class 316.—Three Welsh Mountain Shearling Ewes.

- 2348 I. (£10).—LIEUT.-COL. E. W. GRIFFITH, Plasnewydd, Trefnant, Denbighshire.
2350 II. (£5).—LLYSFASI FARM INSTITUTE, Ruthin.
2355 III. (£3), and 2353 R. N.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber.
H. C.—2352. G.—2347, 2349.

Class 317.—Three Welsh Mountain Ewe Lambs.

- 2359 I. (£10).—MAJOR ERIC J. W. PLATT, Madryn Farm, Aber, Caernarvonshire.
2356 II. (£5).—LIEUT.-COL. E. W. GRIFFITH, Plasnewydd, Trefnant, Denbighshire.
2358 III. (£3).—LLYSFASI FARM INSTITUTE, Ruthin.
2360 R. N.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber, Caernarvonshire.
H. C.—2357.

Black Welsh Mountain.

Class 318.—Black Welsh Mountain Shearling Rams.

- 2365 I. (£10), and 2364 III. (£3).—MRS. JERVOISE, Herriard Park, Basingstoke.
2362 II. (£5).—BROGYNTYN ESTATE COMPANY, Brogyntyn, Oswestry.
2366 R. N.—MAJOR-GEN. LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny, for Llanover Gnat.
H. C.—2361. G.—2367.

Class 319.—Three Black Welsh Mountain Shearling Ewes.²

- 2370 I. (£10), and 2371 II. (£5).—MRS. JERVOISE, Herriard Park, Basingstoke.
2368 III. (£3).—MAJOR OLIVE BEERENS, Swinton Grange, Malton.
2372 R. N.—MAJOR-GEN. LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny.
H. C.—2373. G.—2366.

¹ Prizes given by the Welsh Mountain Sheep Flock Book Society.

² Prizes given by the Black Welsh Mountain Sheep Breeders' Association.

PIGS.

[The numbers in brackets refer to the Tattoo or Ear Numbers of the Animals.]

Large Whites.

Class 320.—Large White Boars, born in or before 1929.

- 2375 I. (#10, Champion,¹ & Champion.²)—CHIVERS & SONS, LTD., Histon, Cambridge, for Histon Wonder 72nd 69269 (1414), born Jan. 1, 1929; s. Histon Wonder 22nd 48247, d. Ramsey Belle 64th 181702 by Hallstone Ringleader 13th 56877.
- 2392 II. (#5, & R. N. for Champion.¹)—W. L. VAWSER, Regent Avenue, March, Cambs. for Westacre Bradbury 206th 70287 (8823), born April 3, 1928, bred by Alfred Lewis, Westacre, King's Lynn; s. Westacre Bradbury 2nd 58273, d. Westacre Surprise 31st 173612 by Bourne Baron 137th 47429.
- 2395 III. (#3.)—W. WHITE & SON, Pool Farm, Taunton, for Fen Bradbury 10th 60773 (22), born Jan. 11, 1927, bred by F. Laud, Bourne, Lincs; s. Bourne Bradbury 63rd 55901, d. Bourne Bonetta 129th 156640 by Bourne King David 36437.
- 2387 IV. (#2.)—JOHN H. PENTY, Glebe Farm, Bolton Percy, York, for Bourne King David 219th 55955 (6112), born July 25, 1925, bred by Edmund Wherry, Bourne, Lincs; s. Bourne King David 20th 40527, d. Bourne Champion Queen 5th 76980 by Sapperton Boy 24477.
- 2394 V. (#1.)—HENRY M. WHITE, Weston Hills, Spalding, for Ramsey Reality 2nd 69751 (163), born July 12, 1928, bred by Jack Major, Ramsey, Hunts; s. Caldmore Expectation 3rd 60281, d. Hallstone Bella 5th 158488 by Caldmore Banner 5th 47717.
- 2384 R. N.—J. PIERPONT MORGAN, Wall Hall, Watford, for Aldenham Bonetta's Boy. H. C.—2376, 2380, 2391.

Class 321.—Large White Boars, born in 1930, before July 1.

- 2409 I. (#10.)—W. L. VAWSER, Regent Avenue, March, Cambs. for Creek Bradbury 8th 71143 (517), born Feb. 18; s. Westacre Bradbury 206th 70267, d. Creek Belle 13th 179228 by Histon Baron 17th 56985.
- 2399 II. (#5.)—LORD DARESBURY, C.V.O., Walton Hall, Warrington, for Handley Bandmaster 7th 71803 (746), born Jan. 4, bred by Herbert Jackson, Chowley Oak, Handley, Chester; s. Walton Bandmaster 35th 70137, d. Osercroft Lily 5th 171612 by Bourne Birkenhead 52273.
- 2410 III. (#3.)—W. WHITE & SON, Pool Farm, Taunton, for Taunton Bradman 73027 (16), born Jan. 2; s. Fen Bradbury 10th 60773, d. Histon Manna 22nd 180654 by Bourne King David 198th 52377.
- 2411 IV. (#2.)—THE WOODBOROUGH HERD, Marden Mill, Devizes, for Woodborough King David 32nd 1824, born Jan. 1; s. Woodborough King David 2nd 70451, d. Woodborough Greenback 45th 192238 by Woodborough Wonder 62801.
- 2406 V. (#1.)—E. THOMLINSON, Hall Farm, Hutton Wandesley, Marston, York, for Tockwith Prince George 29th 73099 (2870), born March 10; s. Packwood Prince Edward 57453, d. Rogerfield Mina 14th 172096 by King of Rogerfield 37297.
- 2408 R. N.—EDWARD TOWGOOD & SONS, LTD., Mill Farm, Sawston, Cambridge, for Towgood Bob. H. C.—2401, 2402.

Class 322.—Large White Boars, born in 1930, on or after July 1.³

- 2433 I. (#10.)—THE WOODBOROUGH HERD, Marden Mill, Devizes, for Woodborough Bandmaster 47th (1780), born July 1; s. Woodborough Bandmaster 15th 73607, d. Hallstone Jess 2nd 189492 by Wentworth Bradbury 29th 62597.
- 2434 II. (#5.)—THE WOODBOROUGH HERD, for Woodborough King David 33rd (1848), born July 3; s. Woodborough King David 2nd 70451, d. Histon Greenback 60th 170448 by Histon Wonder 22nd 48247.
- 2430 III. (#3.)—WALTER W. EYMAN, Wall, Lichfield, for Wall Superb (3683), born July 2; s. Wall Superlative 73347, d. Moreton Primrose 8th 159730 by Bourne Baldwin 52255.
- 2417 IV. (#2.)—LORD DARESBURY, C.V.O., Walton Hall, Warrington, for Walton Hercules 14th (2481), born July 10; s. Adlington Hercules 3rd 59901, d. Bushes Amy 45th 179880 by Tockwith Jay 10th 57991.
- 2416 V. (#1.)—LORD DARESBURY, C.V.O., for Walton Bob 21st (2470), born July 7; s. Walton Bob 14th 70191, d. Walton Primrose 76th 197680 by Walton Boy 39th 66159.
- 2425 R. N.—JOHN H. PENTY, Glebe Farm, Bolton Percy, York, for Glebe Recorder 2nd.

¹ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Large White Boar.

² Silver Challenge Cup given by the National Pig Breeders' Association for the best Large White Pig.

³ Prizes, except Fourth and Fifth, given by the National Pig Breeders' Association.

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2430, 2482, 2507, 2537 Special I.—WALTER W. RYMAN, for Wall Superb, Wall Beautiful 13th, Wall Matchless and Wall Primula.
 2391, 2406, 2487, 2512 Special II.—E. THOMLINSON, for Tockwith Prince George 13th, Tockwith Prince George 28th, Tockwith Blackberry 8th and Tockwith White Heather 17th.
 2375, 2398, 2492, 2519 R. N. for Specials.—CHIVERS & SONS, LTD., for Histon Wonder 72nd, Histon Lion 31st, Histon Dainty Girl 131st and Histon Poppy 14th.

Class 323.—Large White Boars, born in 1931.

2449 I. (£10).—D. R. DAYBELL & SON, Bottesford, Nottingham, for Bottesford Bradbury 34th (2682), born Jan. 7; s. Edmonton Bradbury 3rd 56491, d. Bottesford Buttercup 102nd 168076 by Sapperton President 42263.
 2469 II. (£5).—ALFRED W. WHITE, Hillegom, Spalding, for Spalding King David 21st (1019), born Jan. 8; s. Histon King David 43rd 69173, d. Spalding Belle 40th 106744 by Duston Monitor 23rd 60619.
 2445 III. (£3).—LORD DARESBURY, C.V.O., Walton Hall, Warrington, for Walton Monitor 14th (2652), born Jan. 1; s. Kirby Bedon Monitor 30th 69385, d. Walton Queen Mary 20th 197700 by Pole Lion 7th 65745.
 2470 IV. (£2).—W. WHITE & SON, Pool Farm, Taunton, for Roadwater Champion Jay (70), born Jan. 2, bred by D. J. Case, Roadwater, Taunton; s. Taunton Champion Jay 44th 73029, d. Roadwater Champion Queen 180952 by Taunton Champion Jay 28th 65961.
 2463 V. (£1).—GEO. PAYNE, Wentworth, Elmesthorpe, Leics, for Wentworth Squire (723), born Jan. 12; s. Tockwith Bar-None 2nd 69985, d. Wentworth Queen Anne 32nd 191902 by Wentworth Masterpiece 62619.
 2450 R. N.—D. R. DAYBELL & SON, for Bottesford Bradbury 35th.
 H. C.—2457. C.—2455, 2456, 2466.

Class 324.—Large White Breeding Sows, born in or before 1929.

2487 I. (£10, R. N. for Champion,* & Champion.)*—E. THOMLINSON, Hall Farm, Hutton Wandesley, Marston, York, for Tockwith Blackberry 8th 182368 (2330), born Jan. 2, 1928, farrowed Feb. 25; s. Packwood Prince Edward 57453, d. Histon Blackberry 2nd 147020 by Aldenham Master 36091.
 2482 II. (£5, & R. N. for Champion.)*—WALTER W. RYMAN, Wall, Lichfield, for Wall Beautiful 13th 191690 (1957), born July 24, 1928, farrowed May 6; s. Bourne King David 12th 40516, d. Wall Beautiful 161426 by Hallstone Premier 18th 48098.
 2473 III. (£3).—CHIVERS & SONS, LTD., Histon, Cambridge, for Moreton Perfection 11th 181244 (797), born July 18, 1927, farrowed April 4, bred by R. G. Peel, Moreton Hall, Congleton; s. Bourne Baldwin 52255, d. Moreton Maud 12th 147866 by Caldmore Banner 4th 36569.
 2475 IV. (£2).—LORD DARESBURY, C.V.O., Walton Hall, Warrington, for Peakirk Mary 5th 160130 (262), born Aug. 29, 1925, farrowed Feb. 1, bred by John Neaverson, The Chestnutte, Peakirk, Peterborough; s. Bob of Bourne 28701, d. Spalding Queen Mary 20th 92702 by Monitor of Spalding 30081.
 2476 V. (£1).—LORD DARESBURY, C.V.O., for Walton Queen Mary 8th 191862 (1388), born March 12, 1928, farrowed Jan. 11; s. Lymn Turk 2nd 57157, d. Walton Queen Mary 149544 by Bob of Spalding 40241.
 2488 R. N.—ALFRED W. WHITE, Hillegom, Spalding, for Spalding Baroness 13th.
 H. C.—2472, 2486. C.—2477, 2479, 2481.

Class 325.—Large White Sows, born in 1930, before July 1.

2507 I. (£10).—WALTER W. RYMAN, Wall, Lichfield, for Wall Matchless (3376), born Jan. 10; s. Bourne King David 12th 40516, d. Moreton May 15th 181220 by Bourne Baldwin 52255.
 2503 II. (£5).—J. PIERPONT MORGAN, Wall Hall, Watford, for Aldenham Queen 67th (3841), born Jan. 29; s. Aldenham General 68099, d. Bourne Queen 89th 156806 by Bourne Bradbury 40429.
 2512 III. (£3).—E. THOMLINSON, Hall Farm, Hutton Wandesley, Marston, York, for Tockwith White Heather 17th 197340 (2801), born Jan. 2; s. Packwood Prince Edward 57453, d. Tockwith White Heather 5th 149306 by Bottesford Monitor 2nd 36281.
 2514 IV. (£2).—HENRY W. WHITE, Weston Hills, Spalding, for Weston Wonderful 3rd (1210), born Jan. 6; s. Ramsey Reality 2nd 69761, d. Duston Wonderful 157866 by Duston Delegate 3rd 41107.
 2515 V. (£1).—W. WHITE & SON, Pool Farm, Taunton, for Taunton Manna 197288 (24), born Jan. 2; s. Fen Bradbury 10th 60773, d. Histon Manna 22nd 180654 by Bourne King David 198th 52377.
 2513 R. N.—W. L. VAWSER, Regent Avenue, March, Cambs, for Creek Princess 28th.
 H. C.—2501, 2508. C.—2494, 2499.

* Special Prizes of a Cup or £10 cash (First Prize) and £5 (Second Prize) given by the National Pig Breeders' Association for the best groups of four pigs, bred by Exhibitor. One Boar (at least) must be included in each group, and not more than one entry to be selected from any one Class.

* Silver Challenge Cup given by the National Pig Breeders' Association for the best Large White Pig.

* Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Large White Sow.

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Class 326.—Large White Sows, born in 1930, on or after July 1.

- 2541 I. (210).—HENRY W. WHITE, Weston Hills, Spalding, for Botesford Buttercup 158th (188), born July 18th, bred by D. R. Daybell & Son, Botesford, Nottingham; s. Walton Boy 42nd, d. Botesford Buttercup 107th 178862 by Edmonton Bradbury 30th 56491.
 2537 II. (25).—WALTER W. RYMAN, Wall, Lichfield, for Wall Primula (3688), born July 2; s. Wall Superlative 73347, d. Moreton Primrose 25th 190556 by Bourne Baldwin 52255.
 2540 III. (23).—ALFRED W. WHITE, Hillegom, Spalding, for Spalding Bashful Lady (9418), born July 16; s. Histon King David 43rd 69173, d. Westacre Bashful Lady 8th 191912 by Westacre Bradbury 2nd 58273.
 2535 IV. (22).—WALTER W. RYMAN, for Wall Champion Queen 8th (3676), born July 2; s. Wall Jay 27th 66101, d. Bourne Champion Queen 60th 145384 by Bourne King David 30th 40543.
 2543 V. (21).—W. WHITE & SON, Pool Farm, Taunton, for Taunton Manna 3rd (161), born July 1; s. Taunton King David 3rd 62253, d. Histon Manna 22nd 180654 by Bourne King David 198th 52377.
 2521 E. N.—LORD DAKESBURY, C.V.O., Walton Hall, Warrington, for Walton Bonetta 51st. H. C.—2530, 2546. C.—2534, 2536.

Class 327.—Large White Sows, born in 1931.

- 2571 I. (210).—ALFRED W. WHITE, Hillegom, Spalding, for Spalding Belle 41st (1020), born Jan. 8; s. Histon King David 43rd 69173, d. Spalding Belle 40th 196744 by Duston Monitor 23rd 60619.
 2561 II. (25).—C. J. LITTLE, The Hayes, Hayes Lane, Kenley, Surrey, for Kenley Bonetta 3rd (151), born Jan. 6; s. Standen King David 18th 69869, d. Kenley Bonetta 195374 by Cutthorpe Turk 68605.
 2547 III. (23).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Bonetta 5th (6), born Jan. 5; s. Fen Bradbury 10th 60773, d. Edmonton Bonetta 69th 189004 by Bourne King David 145th 52353.
 2558 IV. (22).—E. HARDING, Packwood Grange, Dorridge, Birmingham, for Packwood Queen Anne 2nd (3501), born Jan. 1; s. Packwood Masterpiece 6th 65687, d. Wall Queen Anne 2nd 191730 by Wall Jay 14th 82425.
 2546 V. (21).—SIR GOMER BERRY, BART., for Pendley Bonetta 3rd (4), born Jan. 5; s. Fen Bradbury 10th 60773, d. Edmonton Bonetta 69th 189004 by Bourne King David 145th 52353.
 2548 E. N.—ERNEST A. CROOKES, Rose Cottage Farm, Cutthorpe, Chesterfield, for Cutthorpe Lady Beatrice 227th. H. C.—2555, 2564. C.—2554, 2567.

Middle Whites.

Class 328.—Middle White Boars, born in or before 1929.

- 2575 I. (210, Champion,¹ & R. N. for Champion).—CHIVERS & SONS, LTD., Histon, Cambridge, for Fordon Marmion 74061 (34), born Feb. 1, 1929, bred by Joseph S. Hinks, High Fordon, Driffield; s. Fordon Dignity 2nd 67577, d. Wharfedale Marmora 166874 by Wharfedale Sunstar 51699.
 2573 II. (25, & R. N. for Champion).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Apache 67091 (87), born Jan. 13, 1927, bred by Major J. A. Morrison, Pendley, Tring; s. Histon Woodman 28th 59057, d. Whitehill Rovers Choice 155388 by Histon Rover 46th 44581.
 2581 III. (23).—LESLIE K. OSMOND, Beelaby Hall, Grimsby, for Amport Jamieson 3rd 67401 (0916), born March 2, 1928, bred by Mrs. Sofer Whitburn, Amport, Andover; s. Wharfedale Jamieson 3rd 28341, d. Amport Choice 5th 162228 by Histon Milpond 35161.
 2574 IV. (22).—W. W. BUCKLE, Old Lane Farm, Colton, Tadcaster, for Fulford Reform 74089 (117), born April 15, 1929, bred by J. Triffitt, Fulford, York; s. Wharfedale Clinker 51673, d. Wharfedale Charming Lady 143840 by Counsellor of Wharfedale 45505.
 2580 V. (21).—E. M. JOWITT, Broad Road Farm, Bridport, for Nonsbury Woodman 8th 67061 (1774), born Sept. 14, 1927, bred by Mrs. A. F. Hayes Sadler, Roundstone Farm, Ferring, Sussex; s. Nonsbury Hive 59267, d. Nonsbury Welcome 17th 166150 by Nonsbury Harold 50791.
 2582 E. N.—LEOPOLD C. PAGET, Hardwick Grange, Clumber Park, Worksop, for Wharfedale Wimple. H. C.—2584. C.—2583.

Class 329.—Middle White Boars, born in 1930, before July 1.

- 2587 I. (210).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Drummer Boy (323), born Jan. 17; s. Shawlands Deliverance 8th, d. Amport Fuchsia 11th 185914 by Wharfedale Jamieson 3rd 28341.

¹ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Middle White Boar.

² Silver Challenge Cup given by the National Pig Breeders' Association for the best Middle White Pig.

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- 2592 II. (25.)—**LESLIE K. OSMOND**, Beelsby Hall, Grimsby, for **Fordon Vanguard 3rd 74079** (212), born Jan. 7, bred by J. Hicks & Sons, High Fordon, Driffield; s. Defender of Ypres 43857, d. Fordon Vera 18th 163882 by Somerton Ben 32427.
- 2594 III. (23.)—**MRS. HAYES SADLER**, Roundstone Farm, Ferring, Sussex, for **Norsbury Jupiter 2nd (2883)**, born March 19; s. Norsbury Jupiter 67829, d. Abberton Delves 174050 by Caldmore Revel Deliverance 58659.
- 2589 IV. (22.)—**PERCY W. HULL**, The Knowle, Hazelwood, Derbyshire, for **Beelsby Jamieson 2nd 73933** (107), born Jan. 1, bred by L. K. Osmond, Beelsby Hall, Grimsby; s. Ampot Jamieson 3rd 67401, d. Sobrite Melody 3rd 177490 by Wharncliffe Master 46847.
- 2588 E. N.—**CHIVERS & SONS, LTD.**, Histon, Cambridge, for **Histon Herald 28th**.
H. C.—2586.
- 2588, 2599, 2635, 2646 **Special I.**—**CHIVERS & SONS, LTD.**, for **Histon Herald 28th**, **Histon Revel 20th**, **Histon Woodlands 6th** and **Histon Choice 181st**.
- 2587, 2615, 2660, 2674 **Special II.**—**SIR GOMER BERRY, BART.**, for **Pendley Drummer Boy**, **Pendley Drummer Boy 5th**, **Pendley Fuchsia 15th** and **Pendley Lady Princess 2nd**.
- 2605, 2639, 2655, 2666 E. N. for **Specials.**—**LEOPOLD C. PAGE**, for **Wharfedale Harlequin**, **Wharfedale Intensity**, **Wharfedale Comforter** and **Wharfedale Phantasy**.

Class 330.—Middle White Boars, born in 1930, on or after July 1.²

- 2596 I. (210.)—**MISS R. B. BABCOCK**, Shawlands, Lingfield, Surrey, for **Shawlands Bold Boy 24th (644)**, born July 3; s. Shawlands Bold Boy 67965, d. Mistley Grace 28th 184723 by Olm of Mistley 45687.
- 2610 II. (25.)—**FRANK SAINSBURY**, Blunt's Hall, Little Wratting, Haverhill, for **Wratting Apollo 3rd (94)**, born July 1; s. Wratting Apollo 2nd 74641, d. Salts Choice 42nd 187500 by Wharfedale Deliverance 32575.
- 2597 III. (23.)—**SIR GOMER BERRY, BART.**, Pendley Stock Farms, Tring, for **Pendley Expectation 2nd (349)**, born July 8; s. Pendley Reveller 74417, d. Pendley Lady Choice 187326 by Whitehill Hasty 4th 59745.
- 2599 IV. (22.)—**CHIVERS & SONS, LTD.**, Histon, Cambridge, for **Histon Revel 20th (924)**, born July 23; s. Histon Revel 8th 67705, d. Histon Joan 16th 184286 by Hammonds Herald 44353.
- 2608 V. (21.)—**LADY H. ROGER**, Yockley House, Camberley, Surrey, for **Yockley Prince 4th (86)**, born July 10; s. Yockley Prince 68077, d. Compton Atbara 9th 183682 by Compton Choice Lad 2nd 63109.
- 2605 E. N.—**LEOPOLD C. PAGE**, Hardwick Grange, Clumber Park, Worksop, for **Wharfedale Harlequin**.
H. C.—2598, 2601. C.—2607, 2609.

Class 331.—Middle White Boars, born in 1931.

- 2627 I. (210.)—**MRS. HAYES SADLER**, Roundstone Farm, Ferring, Sussex, for **Norsbury Vespasian (2588)**, born Jan. 3; s. Norsbury Whelk 2nd 74957, d. Norsbury Virtue 35th 200082 by Roundwood Robert 61179.
- 2615 II. (25.)—**SIR GOMER BERRY, BART.**, Pendley Stock Farms, Tring, for **Pendley Drummer Boy 5th (408)**, born Jan. 10; s. Pendley Drummer Boy, d. Pendley Princess 9th 200202 by Salts Deliverance 8th 55145.
- 2622 III. (23.)—**H. NEAVEYSON**, Airedale, Dogsthorpe, Peterborough, for **Sobrite Actor 2nd (285)**, born Jan. 6; s. Pendley Actor 67089, d. Sobrite Diana 13th 187624 by Sobrite Master 59499.
- 2617 IV. (22.)—**GEORGE GEE**, Ely Grange, Frant, Sussex, for **Mayford Sultan 2nd (760)**, born Jan. 7; s. Mayford Sultan 74307, d. Buttetant Reflection 2nd 183684 by Salts Illuminator 59449.
- 2612 V. (21.)—**MISS R. B. BABCOCK**, Shawlands, Lingfield, for **Shawlands Bold Boy 34th (849)**, born Jan. 14; s. Shawlands Bold Boy 67965, d. Mistley Dorothy 232nd 184680 by Olm of Mistley 45687.
- 2624 E. N.—**LESLIE K. OSMOND**, Beelsby Hall, Grimsby, for **Beelsby Mack**.

Class 332.—Middle White Breeding Sows, born in or before 1929.

- 2638 I. (210, Champion.* & Champion.4)—**LESLIE K. OSMOND**, Beelsby Hall, Grimsby, for **Ampot Helah 6th 185922 (0802)**, born Dec. 12, 1927, farrowed Jan. 4, bred by Mrs. Sofer Whitburn, Ampot St. Mary, Andover; s. Ampot Scotty 54143, d. Ampot Helah 174142 by Wharfedale Deliverance 52575.
- 2635 II. (25.)—**CHIVERS & SONS, LTD.**, Histon, Cambridge, for **Histon Woodlands 6th 175916 (773)**, born Jan. 1, 1927, farrowed Jan. 21; s. Hammonds Herald 44353, d. Ayle Woodlands 150088 by Peene Slasher 45849.

¹ Special Prizes of a Gold Medal or £5 cash (First Prize) and a Silver Medal (Second Prize) given by the National Pig Breeders' Association for the best groups of four Pigs, bred by Exhibitor. One Boar (at least) must be included in each group, and not more than one entry to be selected from any one Class.

² Prizes, except Fourth and Fifth, given by the National Pig Breeders' Association.

³ Silver Challenge Cup given by the National Pig Breeders' Association for the best Middle White Pig.

⁴ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Middle White Sow.

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- 2629 III. (23).—MISS R. B. BABCOCK, Shawlands, Lingfield, for Hammonds Gracious 13th 163716 (692), born March 15, 1925, farrowed April 4, bred by H. R. Beeton, Hammonds, Checkendon, Reading; s. Hammonds Hivite 31661, d. Hammonds Gracious 136822 by Wharfedale Hector 35879.
- 2641 IV. (22).—MRS. HAYES SADLER, Roundstone Farm, Ferring, Sussex, for Norsbury Welcome 45th 200088 (2218), born July 10, 1929, farrowed Jan. 1; s. Norsbury Hivite 2nd 67815, d. Norsbury Welcome 2nd 120832 by Norsbury Vaughan 39201.
- 2639 V. (21).—LEOPOLD C. PAGET, Hardwick Grange, Clumber Park, Worksop, for Wharfedale Integrity 187724 (1667), born July 3, 1928, farrowed Feb. 9; s. Wharfedale Advocate 64001, d. Wharfedale Silver Queen 143858 by Councillor of Wharfedale 46505.
- 2631 R. N.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Fuchsia 13th. H. C.—2630, 2636. C.—2634, 2642.

Class 333.—Middle White Sows, born in 1930, before July 1.

- 2643 I. (210).—MISS R. B. BABCOCK, Shawlands, Lingfield, for Shawlands Miss Dorothy 7th 200510 (461), born Jan. 1; s. Salts Deliverance 15th 59445, d. Mistley Dorothy 232nd 184680 by Hawthorn Sultan 15th 54668.
- 2653 II. (25).—CAPT. D. F. LITTEGOW, South Newington Manor, Banbury, for Steepness Nightingale 2nd 200752 (7), born Jan. 5; s. Compton Khan 66711, d. Compton Nightingale 186222 by Compton Choice Lad 2nd 68109.
- 2646 III. (23).—DRIVERS & SONS, LTD., Histon, Cambridge, for Histon Choice 131st (833), born Jan. 26; s. Hammonds Highborn 2nd 66847, d. Histon Choice 83rd 175820 by Hammonds Herald 44353.
- 2647 IV. (22).—GEORGE GEE, Ely Grange, Frant, Sussex, for Mayford Lady Dorothy 8th 199890 (330), born Jan. 9; s. Hazelwood Hermes 2nd 67635, d. Shawlands Lady Dorothy 3rd 187584 by Hawthorn Sultan 15th 54668.
- 2655 V. (21).—LEOPOLD C. PAGET, Hardwick Grange, Clumber Park, Worksop, for Wharfedale Comforter 200716 (1851), born Jan. 2; s. Wharfedale Axis 67853, d. Wharfedale Comfort 185722 by Wharfedale Actopan 59687.
- 2650 R. N.—T. H. GLADSTONE, Eastcote Grange, Hampton-in-Arden, for Barston Lady 10th. H. C.—2652, 2656. C.—2645, 2657.

Class 334.—Middle White Sows, born in 1930, on or after July 1.

- 2660 I. (210. & R. N. for Champion).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Fuchsia 13th (343), born July 1; s. Pendley Reveler, d. Pendley Fuchsia 13th 200178 by Pendley Apache 67091.
- 2658 II. (25).—MISS R. B. BABCOCK, Shawlands, Lingfield, for Shawlands Miss Graceful 10th (649), born July 3; s. Shawlands Bold Boy 67965, d. Mistley Grace 96th 184728 by Olm of Mistley 45687.
- 2659 III. (23).—FRANKLIN BACHELOR, Cooling Court, Cooling, Rochester, for Cooling Rosa 8th (841), born July 14; s. Amport Illustrious 73901, d. Wattle Sally 3rd 185676 by Kenil Oarsman 35279.
- 2666 IV. (22).—LEOPOLD C. PAGET, Hardwick Grange, Clumber Park, Worksop, for Wharfedale Phantasy (1985), born July 4; s. Fulford Clinker 74083, d. Wharfedale Comfort 185722 by Wharfedale Actopan 59687.
- 2669 V. (21).—LADY H. ROGER, Yockley House, Camberley, for Yockley Rose 2nd (73), born July 6; s. Amport Ranger 3rd 73907, d. Yockley Rose 178114 by Mistley Karim 59243.
- 2672 R. N.—FRANK SAINSBURY, Blunt's Hall, Little Wratting, Haverhill, for Wratting Rosadora 2nd. H. C.—2665. C.—2661, 2668.

Class 335.—Middle White Sows, born in 1931.

- 2674 I. (210).—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring, for Pendley Lady Princess 2nd (416), born Jan. 15; s. Pendley Drummer Boy, d. Pendley Princess 14th 200208 by Salts Deliverance 8th 55145.
- 2694 II. (25).—MRS. HAYES SADLER, Roundstone Farm, Ferring, Sussex, for Norsbury Virtue 69th (2540), born Jan. 3; s. Norsbury Whisk 2nd 74357, d. Norsbury Virtue 35th 200082 by Roundwood Robert 51199.
- 2682 III. (23).—CAPT. D. F. LITTEGOW, South Newington Manor, Banbury, for Steepness Nightingale 3rd (54), born Jan. 2; s. Pendley Deliverance 11th 74395, d. Compton Nightingale 186222 by Compton Choice Lad 2nd 68109.
- 2678 IV. (22).—MISS R. B. BABCOCK, Shawlands, Lingfield, for Shawlands Miss Dorothy 62nd (784), born Jan. 2; s. Oxney Delivery 67077, d. Mistley Dorothy 191st 176386 by Woodman of Hawthorn 39751.
- 2688 V. (21).—LEOPOLD C. PAGET, Hardwick Grange, Clumber Park, Worksop, for Wharfedale Angelica (2018), born Jan. 2; s. Salts Deliverance 15th 59445, d. Wharfedale Comfort 185722 by Wharfedale Actopan 59687.
- 2692 R. N.—G. H. ROSE, Laybrook Home Farm, Thakeham, Fulborough, for Laybrook Mary. H. C.—2676, 2683, 2689. C.—2675, 2685.

¹ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Middle White Sow.

Tamworths.

Class 336.—*Tamworth Boars, born in or before 1929.*

- 2698 I. (#10, & Champion.)—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Milton Prince 2nd 66503 (302), born April 20, 1927, bred by C. L. Coxon, Milton, Pembroke, Hereford; s. Basildon Golden Prince 7th 47071, d. Basildon Reflection 8th 144680 by Milton Bishop 2nd 36041.
- 2699 II. (#5, & R. N. for Champion.)—Mrs. W. F. INGE, Thorpe, Tamworth, for Coldfield Mike 70575 (13), born March 18, 1929, bred by J. A. Frost, New Hall Farm, Sutton Coldfield; s. Verzon Michael 66529, d. Basildon Bashful 13th 167152 by Milton Bishop 2nd 36041.
- 2700 III. (#3.)—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Wall Up to Date 73887 (19), born April 23, 1929, bred by W. W. Ryman, Wall, Lichfield; s. Hookstile Red Start 70585, d. Whittingham Sally 4th 192532 by Caldmore Joe 64165.
- 2697 R. N.—W. A. BINDLEY, Woodbourne, Augustus Road, Edgbaston, Birmingham, for Berkswell Red Ensign.

Class 337.—*Tamworth Boars, born in 1930.*²

- 2709 I. (#10.)—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Berkswell Up to Date (326), born July 24; s. Wall Up to Date 73887, d. Berkswell Bliss 192378 by Caldmore Spec 66483.
- 2705 II. (#5.)—Mrs. W. F. INGE, Thorpe, Tamworth, for Inge's Malvollio (60), born Aug. 10; s. Maplehurst Long Tom 78781, d. Inge's Violet 198448 by Basildon Nomen 3rd 64133.
- 2706 III. (#3.)—WALTER W. RYMAN, Wall, Lichfield, for Verzon David 73887 (55), born Jan. 15, bred by G. F. Fenwick, Ledbury; s. Coldfield Norman 66487, d. Wall Diamond 2nd 823284 by Hamstall Ridware 64169.
- 2707 R. N.—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Peter.
H. C.—2704.

Class 338.—*Tamworth Boars, born in 1931.*

- 2719 I. (#10.)—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Berkswell Up to Date 4th (425), born Jan. 11; s. Wall Up to Date 73887, d. Berkswell Angela 192368 by Verzon Michael 66529.
- 2710 II. (#5.)—W. LINDSEY EVERARD, M.P., Manor Farm, Ratcliffe-on-the-Wreake, Leicester, for Ratcliffe Cardinal (21), born Jan. 16; s. Verzon Carol 66527, d. Basildon Fanny 183084 by Knowle Brutus 47125.
- 2718 III. (#3.)—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Counsellor 2nd (421), born Jan. 10; s. Verzon Michael 66529, d. Berkswell Constance 2nd 183102 by Verzon Red Gauntlet 59881.
- 2711 IV. (#2.)—J. ALBERT FROST, New Hall Farm, Sutton Coldfield, for Coldfield Major (49), born Jan. 18; s. Coldfield Mike 70575, d. Coldfield Katrina 192492 by Basildon Tommy Kirnam 64139.
- 2717 R. N.—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Counsellor.
H. C.—2716. G.—2715.

Class 339.—*Tamworth Breeding Sows, born in or before 1929.*

- 2724 I. (#10, Champion,³ & Champion.)—WALTER W. RYMAN, Wall, Lichfield, for Wall Diamond 4th 183288 (11), born March 14, 1928, farrowed March 13; s. Hamstall Ridware 64169, d. Milton Diamond 178292 by Verzon Beefeater 65165.
- 2725 II. (#5.)—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Berkswell Constance 2nd 183102 (69), born July 25, 1927, farrowed Jan. 10; s. Verzon Red Gauntlet 59881, d. Berkswell Constance 167214 by Knowle Counsellor 59861.
- 2726 III. (#3.)—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Gloriana 192372 (14), born Jan. 6, 1929, farrowed Feb. 7; s. Basildon Tommy Kirnam 10th 64139, d. Milton Bess 33rd 183284 by Darfield Joe 59859.
- 2720 R. N.—W. A. BINDLEY, Woodbourne, Augustus Road, Edgbaston, Birmingham, for Berkswell Constance 4th.
H. C.—2721. G.—2722.

Class 340.—*Tamworth Sows, born in 1930.*

- 2732 I. (#10, R. N. for Champion,³ & R. N. for Champion.)—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Milton Verna 3rd 198456 (369), born Jan. 31, bred by C. L. Coxon, Milton, Pembroke; s. Maplehurst Lucky Joe 21622 C.R., d. Dollar Verna 22056 by O.A.C. Deane A. 18059 C.R.

¹ Champion Silver Gift Medal, or £2 10s. cash, given by the National Pig Breeders' Association for the best Tamworth Boar.

² Prizes given by the National Pig Breeders' Association.

³ Champion Silver Gift Medal, or £2 10s. cash, given by the National Pig Breeders' Association for the best Tamworth Sow.

⁴ Silver Challenge Cup given by the National Pig Breeders' Association for the best Tamworth Pig.

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- 2733 II. (25).—T. R. WILSON, White House Farm, Rufforth, York, for Rufforth Bluebell 193478 (3), born Jan. 2; s. Verzons Christopher 70597, d. Berkswell Red Cap 4th 192428 by Basildon Tommy Kirnam 64139.
 2734 III. (23).—T. R. WILSON, for Rufforth Primrose 198480 (2), born Jan. 2; s. Verzons Christopher 70597, d. Berkswell Red Cap 4th 192428 by Basildon Tommy Kirnam 64139.
 2729 B. N.—WALTER W. RYMAN, Wall Lichfield, for Wall Red Rose.
 H. C.—2727.

Class 341.—*Tamworth Sows, born in 1931.*

- 2742 I. (210).—LIEUT.-COL. C. J. H. WHEATLEY, Berkswell Hall, Coventry, for Berkswell Constance 15th (424), born Jan. 10; s. Verzons Michael 66529, d. Berkswell Constance 2nd 183102 by Verzons Red Gauntlet 59881.
 2744 II. (25).—T. R. WILSON, White House Farm, Rufforth, York, for Rufforth Brilliant Girl 2nd (20), born Jan. 2; s. Rufforth Bonny Boy 73865, d. Bladen Brilliant Girl 3rd 198364 by Darfield Joe 59859.
 2741 III. (23).—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Constance 14th (423), born Jan. 10; s. Verzons Michael 66529, d. Berkswell Constance 2nd 183102 by Verzons Red Gauntlet 59881.
 2743 IV. (23).—T. R. WILSON, for Rufforth Brilliant Girl (19), born Jan. 2; s. Rufforth Bonny Boy 73865, d. Bladen Brilliant Girl 3rd 198364 by Darfield Joe 59859.
 2740 B. N.—LIEUT.-COL. C. J. H. WHEATLEY, for Berkswell Constance 13th.
 H. C.—2735, 2738. C.—2739.

Berkshires.

Class 342.—*Berkshire Boars, born in or before 1929.*

- 2747 I. (210, & Champion).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Chapel President 2803, born Jan. 5, 1929, bred by T. E. Prest, Chapel Farm, Swinton, Malton; s. Highfield Roy President 6th 1638, d. Swinton Careful Marjory 6402 by Hammonds Carrier 1022.
 2750 II. (25, & R. N. for Champion).—FRANK TOWNEND, Highfield, Moor Allerton, Leeds, for Highfield Roy President 6th 1638, born July 28, 1925; s. Highfield Royal President 2nd 339, d. Harewood Bridget 1258 by Herriard Clondyke 23100.
 2749 III. (23).—FRANK TOWNEND, for Bridge Keyring 2771, born Feb. 23, 1929 bred by J. Fricker, Jr., Bridge Close Farm, Hardington, Yeovil; s. Bridge Keystones 1961, d. Bungays Vida 8170 by Bungays Select 1915.
 2748 B. N.—HILLSBOROUGH FRUIT FARM, for Rudgate Hercules.

Class 343.—*Berkshire Boars, born in 1930, before July 1.*

- 2752 I. (210).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Canford King Lud 3159 born Feb. 10, bred by Canford School; s. Woodhouse Golden Arrow 3083, d. Southworth Lunn 12th 9982 by Heale Nutmeg 2nd 26448.
 2753 II. (25).—HILLSBOROUGH FRUIT FARM, for Hillsborough Peacemaker 2nd, born May 29; s. Needhouse Ned, d. Woodhouse Beautiful 6987 by Woodhouse Hottentot 1484.
 2751 III. (23).—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Hillsborough Peacemaker, born May 29, bred by Hillsborough Fruit Farm, Canford, Wimborne; s. Woodhouse Ned 3147, d. Woodhouse Beautiful 6987 by Woodhouse Hottentot 1484.

Class 344.—*Berkshire Boars, born in 1930, on or after July 1.*¹

- 2758 I. (210).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Hillsborough Mr. Prim 7th 3238, born July 8; s. Hillsborough Mr. Prim 2nd 2897, d. Mount Beautiful 2101 by Heale Nutmeg 2nd 26448.
 2755 II. (25).—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Burnham Neil 3147, born Aug. 6; s. Basildon Royal Pygmalion 2358, d. Burnham Nell 10496 by Burnham Claudius 1971.
 2759 III. (23).—HILLSBOROUGH FRUIT FARM, for Hillsborough Ned 3237, born July 10; s. Woodhouse Ned 3417, d. Dunmanor Gay Lass 7726 by Basildon Bombardier 1166.
 2757 IV. (23).—R. V. GARTON, Langbourne, Blandford, for Langbourne British King 2nd, born July 8; s. Bridge Keyway 2363, d. Langbourne Marjia 3rd 9704 by Kingstone British King 1892.
 2762 B. N.—FRANK TOWNEND, Highfield, Moor Allerton, Leeds, for Linton Amanniah.
 H. C.—2760.

Class 345.—*Berkshire Boars, born in 1931.*

- 2769 I. (210).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Hillsborough Hercules, born Jan. 9; s. Rudgate Hercules 2595, d. Canford Miss Prim 2nd 6997 by Buckland Bachelor 1411.

¹ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Berkshire Boar.

² Prizes, except Fourth, given by the National Pig Breeders' Association.

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- 2768 II. (25).—R. V. GARTON, Langbourne, Blandford, for Langbourne British King 3rd born Jan. 4; s. Suddon Eminent, d. Langbourne Maruja 3rd 9704 by Kingstone British King 1692.
- 2770 III. (23).—HILLSBOROUGH FRUIT FARM, for Hillsborough President, born Jan. 2; s. Chapel President 2803, d. Canford Bright Girl 7th 7546 by Manna 1480.
- 2767 IV. (22).—GEORGE FILLINGHAM, Syerston Hall, Newark, for Syerston President 8th, born Feb. 15; s. Geeston Baron 2425, d. Syerston Sally Lunn 8th 11324 by Syerston President 2849.
- 2766 R. N.—GEORGE FILLINGHAM, for Syerston President 8th.
H. C.—2765. C.—2771.

Class 346.—Berkshire Breeding Sows, born in or before 1929.

- 2783 I. (210, Champion,¹ & Champion.²)—FRANK TOWNEND, Highfield, Moor Allerton, Leeds, for Swinton Proud Queen 12200, born July 1, 1929, farrowed Feb. 16, bred by Major Olive Behrens, Swinton Grange, Malton; s. Swinton President 1135, d. Swinton High Queen 4th 12174 by Highfield Roy President 6th 1638.
- 2776 II. (25, R. N. for Champion,¹ & R. N. for Champion.²)—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Burnham Godiva 11536, born July 8, 1929, farrowed Jan. 28; s. Richings British Royalist 2203, d. Godinton Daisy 14th 7808 by Godinton Lunn King 1645.
- 2780 III. (23).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Southworth Lunn 12th 9982, born July 14, 1927, farrowed Feb. 7, bred by Joseph Ball, Southworth Hall, Warrington; s. Heale Nutmeg 2nd 26448, d. Southworth Lunn 5th 8570 by Swinton Printer 1309.
- 2775 IV. (22).—E. CLIFTON-BROWN, for Ashe Spice 7260, born March 8, 1927, farrowed Feb. 12, bred by T. L. Martin, Ashe Warren, Overton, Hants; s. Heale Nutmeg 2nd 26448, d. Ashe Marcella 2nd 4101 by Hammonds Hottentot 21218.
- 2779 R. N.—HILLSBOROUGH FRUIT FARM, for Hillsborough Miss Prim 6th.
H. C.—2782. C.—2781.

Class 347.—Berkshire Sows, born in 1930, before July 1.

- 2793 I. (210).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Canford Select 3rd, born April 26, bred by Canford School; s. Woodhouse Ned, d. Hammonds Select 7874 by Carry On 21191.
- 2790 II. (25).—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Burnham Griqua 11588, born Jan. 24; s. Burnham Nutcracker 2785, d. Godinton Daisy 14th 7808 by Godinton Lunn King 1645.
- 2792 III. (23).—HILLSBOROUGH FRUIT FARM, for Canford Select 2nd 11624, born April 26, bred by Canford School; s. Woodhouse Ned 3417, d. Hammonds Select 7876 by Carry On 21191.
- 2789 IV. (22).—W. A. BINDLEY, Woodbourne, Augustus Road, Edgbaston, Birmingham, for Pamington Rhoda 2nd 11932, born Jan. 30; s. Highfield Royal Pygmalion 11th 2073, d. Pamington Rhoda 8472 by Pamington Scaram 1088.
- 2791 R. N.—GEORGE FILLINGHAM, Syerston Hall, Newark, for Syerston Augusta 8th.

Class 348.—Berkshire Sows, born in 1930, on or after July 1.

- 2801 I. (210).—HILLSBOROUGH FRUIT FARM, Canford, Wimborne, for Hillsborough Lady 5th 11770, born July 9; s. Hillsborough Mr. Prim 4th 2901, d. Canford Lady 3rd 9306 by Mana 1480.
- 2802 II. (25).—T. E. PREST, Chapel Farm, Swinton, Malton, for Chapel Margaret 5th 11634, born July 3; s. Woodhouse Amanullah 2nd 2691, d. Swinton Carry Margaret 4th 12136 by Hammonds Carrier 1022.
- 2803 III. (23).—STEPHEN WIGHELL, JR., Linton, Winttingham, Malton, for Linton Cheerful 1 Margaret, born July 1; s. Woodhouse Amanullah 2nd 2691, d. Swinton Cheerful Margaret 3rd 12146 by Hammonds Carrier 1022.
- 2798 IV. (22).—E. CLIFTON-BROWN, Burnham Grove, Burnham, Bucks, for Burnham Neave, born Aug. 6; s. Basildon Royal Pygmalion 2353, d. Burnham Nelli 10496 by Burnham Claudius 1971.
- 2799 R. N.—R. V. GARTON, Langbourne, Blandford, for Langbourne Meg 3rd.
H. C.—2800.

Class 349.—Berkshire Sows, born in 1931.

- 2808 I. (210).—GEORGE FILLINGHAM, Syerston Hall, Newark, for Syerston Sally Lunn 16th, born Feb. 8; s. Geeston Baron 2425, d. Syerston Sally Lunn 9th 11326 by Syerston President 2849.
- 2810 II. (25).—R. V. GARTON, Langbourne, Blandford, for Langbourne Maruja 5th, born Jan. 4; s. Suddon Eminent 3367, d. Langbourne Maruja 3rd 9704 by Kingstone British King 1692.

¹ Champion Gold Medal, or £5 cash, given by the National Pig Breeders' Association for the best Berkshire Sow.

² The "Eaton" Silver Challenge Cup given through the National Pig Breeders' Association for the best Berkshire Pig.

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- 2814 III. (23).—FRANK TOWNEND, Highfield, Moor Allerton, Leeds, for Chapel Margaret 8th, born Jan. 12, bred by T. E. Prest, Chapel Farm, Swinton, Malton; s. Woodhouse Amanullah 2nd 2691, d. Swinton Carry Margaret 4th by Hammonds Carrier 1022.
- 2809 IV. (22).—GEORGE FILLINGHAM, for Syerston Sally Lunn 17th, born Feb. 8; s. Geeston Baron 2425, d. Syerston Sally Lunn 9th 11326 by Syerston President 2649.
- 2813 V. (21).—T. E. PREST, Chapel Farm, Swinton, Malton, for Chapel Margaret 8th, born Jan. 12; s. Woodhouse Amanullah 2nd 2691, d. Swinton Carry Margaret 4th 12136 by Hammonds Carrier 1022.
- 2815 R. N.—FRANK TOWNEND, for Highfield Princess Royal 71st.
H. C.—2816.

Wessex Saddlebacks.

Class 350.—*Wessex Saddleback Boars, born in or before 1929.*

- 2817 I. (210, Champion.¹ & R. N. for Champion.²)—DR. WILLIAM H. FORSHAW, Slythehurst, Ewhurst, Guildford, for Carlos of Slythehurst 3024, born Jan. 8, 1927, bred by Oswald Ellis, Nurscombe, Bramley, Guildford; s. Slythehurst Prince Charlie 2713, d. Shillinglee Heroine 2nd 9078 by Norman of Shillinglee 1286.
- 2819 II. (25, & R. N. for Champion.³)—DOLPHIN SMITH, Mackrey End, Harpenden, for Besford Hero 4th 3411, born Feb. 22, 1929, bred by H. Harris, New Farm, Besford, Worcs.; s. Hoglette Hero 3027, d. Besford Brenda 10th 14652 by Offa Hero 1st 1914.
- 2820 III. (23).—DOUGLAS VICKERS, Preston, Hitchin, for Preston Squire 3265, born July 2, 1928; s. Brandon Tomahawk 2nd 2879, d. Preston Sunstar 1st 12062 by Royston Cicero 1530.
- 2818 R. N.—H. G. LAKIN, Pipers Hill, Leamington, for Pipers Duke.

Class 351.—*Wessex Saddleback Boars, born in 1930.³*

- 2831 I. (210).—DOUGLAS VICKERS, Preston, Hitchin, for Preston Viceroy 2nd 3469, born Jan. 3; s. Preston Squire 3265, d. Preston Vanity 12206 by Preston Prince 1767.
- 2824 II. (25).—DR. WILLIAM H. FORSHAW, Slythehurst, Ewhurst, Guildford, for Slythehurst Challenger 3390, born Jan. 6; s. Slythehurst Charles 3239, d. Slythehurst Chatterne 14711 by Slythehurst Bar-None 2336.
- 2827 III. (23).—H. G. LAKIN, Pipers Hill, Leamington, for Pipers Mischief 3371, born Jan. 14; s. Pipers Duke 3284, d. Pipers Vamp 14860 by Tring Commander 2115.
- 2826 IV. (22).—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Preston Tomahawk 3422, born April 9, bred by Douglas Vickers, Preston, Hitchin; s. Preston Squire 3265, d. Preston Laurette 14940 by Oakley Prior 1678.
- 2821 R. N.—H. L. BROOKSBANK, Sandrock, Tickhill, Yorks, for Preston Odin.

Class 352.—*Wessex Saddleback Boars, born in 1931.*

- 2833 I. (210).—F. W. GENTLE, 33, High Street, Brandon, for Brandon David 3495, born Jan. 1; s. Brandon Dunstan 3161, d. Brandon Daybreak 14829 by Preston Dunstan 2637.
- 2839 II. (25).—DOUGLAS VICKERS, Preston, Hitchin, for Preston Defender 3477, born Jan. 5; s. Yarty Monarch 3rd 3282, d. Preston Dagmar 2nd 15181 by Preston Valentine 3111.
- 2834 III. (23).—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Chellaston Hero 3472, born Jan. 5; s. Besford Hero 1st 3168, d. Chellaston Runaway 14679 by Chellaston Merry Lad 2927.
- 2835 IV. (22).—H. H. HARRIS, New Farm, Besford, Worcester, for Besford Hero 11th 3498, born Jan. 24; s. Hoglette Hero 3027, d. Besford Brenda 10th 14652 by Offa Hero 1914.
- 2832 R. N.—DR. WILLIAM H. FORSHAW, Slythehurst, Ewhurst, Guildford, for Slythehurst Royalist.

Class 353.—*Wessex Saddleback Breeding Sows, born in or before 1929.*

- 2847 I. (210, Champion.¹ & Champion.²)—DOUGLAS VICKERS, Preston, Hitchin, for Preston Venus 15825, born Feb. 27, 1928, farrowed Jan. 9; s. Preston Dandy 2985, d. Preston Vain 12274 by Norman King Offa 219.
- 2841 II. (25, & R. N. for Champion.³)—H. L. BROOKSBANK, Sandrock, Tickhill, Yorks, for Sandrock Star 1st 14376, born Aug. 14, 1926, farrowed Jan. 26; s. Weiwyn Rufus 2502, d. Ashe Star 5th 12029 by Ashe Mac 2nd 680.
- 2846 III. (23).—COL. G. H. MYTTON, Chadlington Downs, Chipping Norton, for Holbury Saffron 14730, born Aug. 23, 1926, farrowed Feb. 5, bred by G. R. Southwell, Holbury Farm, Lockerley, Romsey, Hants; s. Ayot Beau Brocade 1619, d. Holbury Sylvia 6401 by Norman Perfection 660.
- 2843 R. N.—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Preston Druidess.

¹ Champion Silver Gilt Medal, or £2 10s. cash, given by the National Pig Breeders' Association for the best Wessex Saddleback Boar.

² Silver Challenge Cup given by the National Pig Breeders' Association for the best Wessex Saddleback Pig.

³ Prizes, except Fourth, given by the National Pig Breeders' Association.

⁴ Champion Silver Gilt Medal, or £2 10s. cash, given by the National Pig Breeders' Association for the best Wessex Saddleback Sow.

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Class 354.—Wessex Saddleback Sows, born in 1930.

- 2856 I. (#10).—DOUGLAS VICKERS, Preston, Hitchin, for Preston Diadem 15876, born Jan. 10; s. Yarty Monarch 8rd 3282, d. Preston Diamond 15183 by Brandon Tomahawk 2nd 2879.
 2851 II. (#5).—FRED W. GENTLE, 33, High Street, Brandon, for Brandon Dawn 15772, born Jan. 22; s. Brandon Dunstan 3161, d. Brandon Daybreak 14829 by Preston Dunstan 2937.
 2853 III. (#3).—COL. H. G. MYTTON, Chadlington Downs, Chipping Norton, for Garth Ardent 15550, born Jan. 15; s. Awebridge Standard 2646, d. Holbury Saffron 14730 by Ayot Beau Brocade 1619.
 2850 IV. (#2).—DR. WILLIAM H. FORSHAW, Slythehurst, Ewhurst, Guildford, for Slinfold Charity 15873, born March 5, bred by Major E. F. St. John, Slinfold Lodge, Horsham; s. Slythehurst Charles 3239, d. Smokey of Slinfold 14564 by Cattistock Mighty Atom 2355.
 2849 R. N.—H. L. BROOKSBANK, Sandrock, Tickhill, Yorks, for Sandrock Gift.

Class 355.—Wessex Saddleback Sows, born in 1931.

- 2860 I. (#10).—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Chellaston Runaway 6th 15883, born Jan. 5; s. Besford Hero 1st 5168, d. Chellaston Runaway 14879 by Chellaston Merry Lad 2927.
 2861 II. (#5).—E. H. HARRIS, New Farm, Besford, Worcester, for Besford Brenda 16th, born Jan. 24; s. Hoglette Hero 3027, d. Besford Brenda 10th 14662 by Oña Hero 3027.
 2864 III. (#3).—COL. G. H. MYTTON, Chadlington Downs, Chipping Norton, for Garth Betty 15924, born Jan. 1; s. Awebridge Standard 2646, d. Godalming Hetty 14533 by Godalming Rover 3036.
 2865 R. N.—DOUGLAS VICKERS, Preston, Hitchin, Herts, for Preston Dinah.

Large Blacks.

Class 356.—Large Black Boars, born in or before 1929.

- 2866 I. (#10, & Champion.¹).—D. W. P. GOUGH, Pakenham Manor, Bury St. Edmunds, for Tartar Mandarin F.67, born Jan. 7, 1929, bred by G. A. Goodchild, Great Yeldham, Essex; s. Tartar Sample D.109, d. Tartar Victoria 5th A.3768 by Drayton Mikado 1st 11859.
 2868 II. (#5).—THE EARL OF DARTMOUTH, Patshull House, Wolverhampton, for Patshull Leader 2nd F.325, born July 10, 1929; s. Tinten Leader C.849, d. Patshull Susan 4th D.594 by Patshull Prince 1st B.405.
 2872 III. (#3).—WALTER J. WARREN, Deacon's Farm, Staplegrave, Taunton, for Kibbear Royal Prior 5th C.119, born Jan. 5, 1926; s. Kibbear Royal Willie 26777, d. Haselbury Beauty 87272 by Brent Councillor 17953.
 2873 R. N.—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Baydon Prior 4th.

Class 357.—Large Black Boars, born in 1930, before July 1.

- 2880 I. (#10, & R. N. for Champion.¹).—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Baydon Satisfied 8th G.289, born Jan. 25; s. Baydon Satisfied 2nd D.389, d. Baydon Lass 7th E.1240 by Kibbear Royal Prior 4th A.1225.
 2878 II. (#5).—MISS KAY-MOUAT, Firs Farm, Malvern Wells, for Treslay Blue Blood 15th G.129, born Jan. 10, bred by R. Gynn & Son, Treslay, Camelford; s. Menna Speculation 2nd D.693, d. Treslay Belle 19th E.1098 by Maori Khedive C.371.
 2874 III. (#3).—F. G. ALEXANDER, Laurels Farm, Fulham Market, Diss, for Kedington None Such 2nd G.267, born Feb. 3, bred by Frank Sainsbury, Blunt's Hall, Little Wratting, Haverhill; s. Treslay None Such 1st E.361, d. Kedington Model 2nd D.1426 by Newland Selim C.31.
 2876 R. N.—THE EARL OF DUCIE, Tortworth Court, Falfeld, Glos, for Tortworth Emperor. 2879, 2908, 2936 Gold Vase.²—FRANK SAINSBURY, for Kedington Non Such, Kedington Constance 15th and Kedington Spider 6th.
 2868, 2904, 2915 R. N. for Gold Vase.³—THE EARL OF DARTMOUTH, for Patshull Leader 2nd, Patshull Bangle 10th and Patshull Ducat 14th.

Class 358.—Large Black Boars, born in 1930, on or after July 1.³

- 2889 I. (#10).—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Baydon Highlander 15th G.537, born Sept. 26; s. Brent H.J.K. F.437, d. Baydon Nightingale 22nd C.3098 by Valley General 2nd 25401.
 2887 II. (#5).—S. OWEN WEBB, Streetly Hall, West Wickham, Cambs., for Streetly Luck G.557, born Nov. 10; s. Streetly Benedict F.499, d. Pakenham Lassie 2nd F.932 by Valley Quality C.173.

¹ Silver Challenge Cup, and Gold Medal to the Breeder, given by the Large Black Pig Society for the best Boar.

² The "Baydon" Gold Vase given through the Large Black Pig Society for the best Group consisting of one Boar from Classes 356, 357, or 358; one Breeding Sow from Class 360; and one Sow from Classes 360, 361, or 362.

³ Prizes given by the Large Black Pig Society.

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- 2885 **III. (23).**—GEOFFREY G. MYATT, Beechcroft, Kilminster, Axminster, for Kibbear My Friend G.367, born Aug. 27, bred by Walter J. Warren, Deacon's Farm, Staplegrave, Taunton; s. Kilminster Royal Laddie F.387, d. Pednor Lass 5th B.292 by Pednor Royal 2nd 29389.
- 2884 **R. N.**—T. F. JAMES, Chantersluer Farm, Norwood Hill, Horley, for Trelnuckey Radio 3rd.

Class 359.—Large Black Boars, born in 1931.

- 2898 **I. (210).**—MISS KAY-MOUAT, Firs Farm, Malvern Wells, for McHeather Sultan 12th H.27, born Jan. 4; s. Trealey Blue Blood 15th G.129, d. McHeather Susan 19th A.5658 by Cornwood Sunstar 80951.
- 2895 **II. (25).**—D. W. P. GOUGH, Pakenham Manor, Bury St. Edmunds, for Tartar Archibald H.77, born Jan. 1, bred by G. A. Goodchild, Great Yeldham Hall, Essex; s. Tartar Agent G.95, d. Tartar Mary 3rd F.636 by Tartar Sample D.109.
- 2890 **III. (23).**—W. J. AOREMAN, Langland Farm, Catcott, Bridgwater, for Langland Duke H.71, born Jan. 17; s. Valley Accommodation D.801, d. Cornwood Souvenir C.2962 by Martham Marvel 22073.
- 2900 **IV. (22).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for Kedington None Such 4th H.47, born Jan. 5; s. Kedington None Such G.97, d. Thelveton Vera 14th F.560 by Thelveton Hero B.741.
- 2899 **V. (21).**—JOHN A. LAWFORD, Heronsdale Manor, Waldron, Sussex, for Broyle Black King 1st H.67, born Jan. 1; s. Treveglis Felix 4th G.5, d. Broyle Souriya 2nd F.154 by Trelnuckey Warrior 2nd C.995.
- 2902 **R. N.**—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Baydon King 3rd.

Class 360.—Large Black Breeding Sows, born in or before 1929.

- 2908 **I. (210, & Champion.)**—THE MARQUESS OF AILESBUURY, Savernake Forest, Marlborough, for Baydon Nightingale 59th E.1246, born Sept. 24, 1928, farrowed Jan. 2, bred by W. Woolland, Baydon Manor, Ramsbury, Marlborough; s. Kibbear Royal Prior 4th A.1225, d. Baydon Nightingale 22nd C.8098 by Valley General 2nd 25401.
- 2908 **II. (25).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for Kedington Constance 13th D.2466, born Aug. 1, 1927, farrowed March 15; s. Kedington Brigand C.583, d. Kedington Constance 2nd 128718 by Ashby Lex 24747.
- 2909 **III. (23).**—B. HELLIER SMITH, West Newton, Bridgwater, for West Newton Princess D.1818, born May 28, 1927, farrowed Feb. 25; s. Kibbear Royal Prior 4th A.1225, d. Langland Princess 12th B.4070 by Cornwood Scorchers A.1227.
- 2910 **IV. (22).**—JOHN WARNE & SON, Tregonhayne Manor, Tregony, Cornwall, for Banns Biddy 2nd C.4382, born Nov. 28, 1926, farrowed Jan. 3, bred by W. Hoskin, Boscarne, St. Buryan; s. Fentongollen Amir 2nd B.429, d. Banns Biddy B.1262 by Tredethy Hero 28675.
- 2905 **R. N.**—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Whiteway Pearl 19th.

Class 361.—Large Black Sows, born in 1930, before July 1.

- 2921 **I. (210, & R. N. for Champion.)**—JOHN A. LAWFORD, Heronsdale Manor, Waldron, Sussex, for Broyle Lavinia 1st G.182, born Jan. 5; s. Trelnuckey Warrior 2nd C.995, d. Broyle Nymph 1st A.5154 by Arran Dandy 31159.
- 2923 **II. (25).**—JOHN WARNE & SON, Tregonhayne Manor, Tregony, Cornwall, for Treveglis Biddy 1st G.4, born Jan. 3, bred by John Warne; s. Treveglis Felix 3rd A.1259, d. Banns Biddy 2nd C.4382 by Fentongollen Amir 2nd B.429.
- 2920 **III. (23).**—D. W. P. GOUGH, Pakenham Manor, Bury St. Edmunds, for Fowlmare Fancy 25th G.700, born March 4, bred by W. C. Jackson, Fowlmare, Cambs.; s. Bardolph Night Boy E.417, d. Fowlmare Fancy 1st E.2236 by Fowlmare Black Boy B.637.
- 2917 **IV. (22).**—FRANK W. GILBERT, The Manor, Chellaston, Derby, for Chellaston Pearl 5th G.824, born March 3; s. Tinten Result E.371, d. Whiteway Pearl 19th D.3306 by Valley Crusader C.933.
- 2918 **V. (21).**—FRANK W. GILBERT, for Kibbear Royal Lass 5th G.18, born Jan. 2, bred by W. J. Warren, Deacon's Farm, Staplegrave, Taunton; s. Kibbear Royal Henry 1st D.679, d. Pednor Lass 5th B.292 by Pednor Royal 2nd 29389.
- 2926 **R. N.**—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for Baydon Lass 18th. H. C.—2913.

Class 362.—Large Black Sows, born in 1930, on or after July 1.

- 2933 **I. (210).**—JOHN H. GROVER, Cornwood, Devon, for Cornwood Empress G.1314, born July 1; s. Treveglis Chief 1st C.109, d. Patchull Susan 4th D.594 by Patchull Prince 1st B.405.
- 2934 **II. (25).**—D. W. P. GOUGH, Pakenham Manor, Bury St. Edmunds, for Pakenham Sunshine 2nd G.1740, born July 4; s. Pakenham Rambler F.433, d. Pakenham Snowdrop 2nd E.32 by Drayton Froconsul C.985.
- 2927 **III. (23).**—H. G. ALEXANDER, Laurels Farm, Fulham Market, Diss, for Depwade Good Girl 4th G.1348, born July 8; s. Coolham Gunfire 5th E.29, d. Depwade Godiva 6th E.1498 by Pakenham Charlie C.851.
- 2936 **IV. (22).**—FRANK SAINSBURY, Blunt's Hall, Little Wrattling, Haverhill, for Kedington Spider 6th G.1608, born July 26; s. Kedington Monogram B.759, d. Kedington Spider B.1524 by Kedington Conqueror 30817.

* Silver Challenge Cup, and Gold Medal to the Breeder, given by the Large Black Pig Society for the best Sow.

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- 2937 V. (21).—WALTER J. WARREN, Deacon's Farm, Staplegrave, Taunton, for *Kibbear Lady Friend* G.972, born Aug. 27; s. *Kimington Royal Laddie* F.377, d. *Pednor Lass* 5th B.292 by *Pednor Royal* 2nd 29389.
- 2938 R. N.—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for *Cornwood Empress* 1st.

Class 363.—Large Black Sows, born in 1931.

- 2943 I. (10).—FRANK W. GILBERT, The Manor, Chellaston, Derby, for *Chellaston Moonlight* 4th H.72, born Jan. 17; s. *Pakenham Bouncer* 1st G.49, d. *Whiteway Moonlight* 12th C.1616 by *Wisdom Pleasure* 23679.
- 2944 II. (25).—D. W. P. GOUGH, Pakenham Manor, Bury St. Edmunds, for *Tartar Infanta* 2nd H.128, born Jan. 1, bred by G. A. Goodchild, Great Yeldham Hall, Essex; s. *Tartar Agent* G.95, d. *Tartar Mary* 3rd F.636 by *Tartar Sample* D.109.
- 2948 III. (23).—MISS KAY-MOUAT, Firs Farm, Malvern Wells, for *McHeather Susan* 35th H.58, born Jan. 4; s. *Treslay Blue Blood* 15th G.129, d. *McHeather Susan* 19th A.5658 by *Cornwood Sunstar* 30951.
- 2952 IV. (22).—W. WOOLLAND, Baydon Manor, Ramsbury, Marlborough, for *Trevaglio Queen* 2nd H.26, born Jan. 4, bred by John Warne, Tregonhayne Manor, Tregony, Cornwall; s. *Trevaglio Laddie* 11th D.759, d. *Menna Queen* 133rd F.734 by *Westpetherwin General* A.111.
- 2940 V. (21).—HARRY E. BASTARD, Tinten Manor, St. Tudy, Cornwall, for *Tinten Heroine* 23rd H.10, born Jan. 3; s. *Westpetherwin Leader* 2nd E.553, d. *Tinten Heroine* 18th E.54 by *Tinten Leader* C.849.
- 2945 R. N.—R. GYNN & SON, Treslay, Boscastle, for *Treslay Dimple* 6th.

Gloucestershire Old Spots.

Class 364.—Gloucestershire Old Spots Boars, born in or before 1929.

- 2955 I. (10).—J. F. WRIGHT, Olton Farm, Solihull, for *Solihull Buster* 5858, born Oct. 16, 1928; s. *Knowie Bonzo* 5769, d. *Solihull Susan* 4th X.937 by *Kingweston Pierrot* 3284.
- 2953 II. (25).—SHERRIFF & SONS, Lemsford, Welwyn Garden City, Herts, for *Hempstead Jim* 17th 5888, born May 20, 1929, bred by W. T. & A. G. Bailey, Grist House, Hemel Hempstead; s. *Hempstead Jim* 12th 5808, d. *Hempstead Daphne* 21st Z.047 by *Hempstead General* 5498.
- 2954 III. (23).—EDWARD T. WISE, Beausale, Warwick, for *Solihull Joe* 5870, born Feb. 3, 1929, bred by J. F. Wright, Olton Farm, Solihull; s. *Solihull Punch* 5774, d. *Solihull Josephine* 5th Z.270 by *Solihull Jock* 5666.

Class 365.—Gloucestershire Old Spots Boars, born in 1930.¹

- 2958 I. (10, Champion,² & Champion.³)—J. F. WRIGHT, Olton Farm, Solihull, for *Solihull Bob* 5914, born May 4; s. *Solihull Buster* 5858, d. *Solihull Bonetta* Z.385 by *Maiden Bradley Submarine* 2nd 5720.
- 2956 II. (25).—SHERRIFF & SONS, Lemsford, Welwyn Garden City, Herts, for *Nashes Duke* 18th 5932, born July 5; s. *Hempstead Spot* 5619, d. *Nashes Duchess* 40th Z.278 by *Eastacott Defiance* 5607.
- 2959 III. (23).—J. F. WRIGHT, for *Solihull Primus* 5956, born April 26; s. *Solihull Buster* 5858, d. *Solihull Primrose* 5th Z.427 by *Maiden Bradley Submarine* 2nd 5720.
- 2957 R. N.—EDWARD T. WISE, Beausale, Warwick, for *Knowie Dick*.

Class 366.—Gloucestershire Old Spots Boars, born in 1931.

- 2961 I. (10, & R. N. for Champion.³)—H. R. McCracken, Beara Farm, Pilton, Barnstaple, for *Beara Scarmouche* 5940, born Feb. 8; s. *Thornbury Bandage* 5804, d. *Beara Sauce* Z.425 by *Ashford June* Lad 5760.
- 2962 II. (25).—SHERRIFF & SONS, Lemsford, Welwyn Garden City, Herts, for *Nashes Duke* 20th 5941, born Jan. 2; s. *Pevensley Hero* 5820, d. *Nashes Duchess* 44th Z.439 by *Hempstead Spot* 5619.
- 2960 III. (23).—T. P. P. KENT, Ashford House, Ashford, Barnstaple, for *Beara Brilliant*, born Feb. 8, bred by H. R. McCracken, Beara, Pilton, Barnstaple; s. *Thornbury Bandage* 5840, d. *Beara Sauce* Z.425 by *Ashford June* Lad 5760.
- 2964 R. N.—J. F. WRIGHT, Olton Farm, Solihull, for *Solihull Dick*.

Class 367.—Gloucestershire Old Spots Breeding Sows, born in or before 1929.

- 2968 I. (10, & R. N. for Champion.⁴)—T. P. P. KENT, Ashford House, Ashford, Barnstaple, for *Ashford Realisation* Z.516, born Sept. 1, 1928, farrowed March 8; s. *Holmwood Buffalo* 5714, d. *Maiden Bradley Anticipation* 4th Z.312 by *Thornbury Bison* 5554.

¹ Prizes given by the Gloucestershire Old Spots Pig Society.

² Silver Challenge Cup given through the Gloucestershire Old Spots Pig Society for the best Boar.

³ Perpetual Silver Challenge Cup given through the Gloucestershire Old Spots Pig Society for the best Gloucestershire Old Spots Pig.

⁴ Perpetual Silver Challenge Cup given through the Gloucestershire Old Spots Pig Society for the best Sow.

Awards of Live Stock Prizes at Warwick, 1931. cxxxix

- 2969 II. (25.)—H. R. MCCRACKEN, Beara Farm, Plilton, Barnstaple, for Beara Sauce Z.425, born Aug. 16, 1928, farrowed Feb. 8; s. Ashford June Lad 5760, d. Maiden Bradley Stylish 6th Z.151 by Thornbury Bison 5554.
- 2970 III. (23.)—SHERIFF & SONS, Lemsford, Welwyn Garden City, Herts, for Nashes Duchess 44th Z.439, born Jan. 1, 1929, farrowed Jan. 2; s. Hempstead Spot 5619, d. Nashes Duchess 40th Z.278 by Eastcott Defiance 5607.
- 2967 IV. (22.)—MAJOR R. F. FULLER, Great Chalfield, Melksham, Wilts, for Chalfield Blossom 7th Z.588, born Aug. 9, 1929, farrowed March 4; s. Maiden Bradley Judge 2nd 5825, d. Chalfield Blossom Z.352 by Hempstead Jim 8th 5735.
- 2971 R. N.—EDWARD T. WISE, Beausale, Warwick, for Beausale Beatrice 7th.

Class 368.—Gloucestershire Old Spots Sows, born in 1930.

- 2980 I. (210.)—R. N. for Champion,¹ & Champion.²—SHERIFF & SONS, Lemsford, Welwyn Garden City, Herts, for Nashes Duchess 49th Z.631, born July 5; s. Hempstead Spot 5619, d. Nashes Duchess 40th Z.278 by Eastcott Defiance 5607.
- 2984 II. (25.)—J. F. WRIGHT, Olton Farm, Solihull, for Solihull Josephine 12th Z.605, born Aug. 26; s. Holmwood Lillywhite 5th 5869, d. Solihull Josephine 9th Z.525 by Solihull Buffalo 5845.
- 2981 III. (23.)—SHERIFF & SONS, for Nashes Duchess 50th Z.632, born May 4; s. Pevensey Hero 5820, d. Nashes Duchess 44th Z.439 by Hempstead Spot 5619.
- 2983 IV. (22.)—J. F. WRIGHT, for Solihull Bonetta 1st Z.579, born May 4; s. Solihull Buster 5858, d. Solihull Bonetta Z.385 by Maiden Bradley Submarine 2nd 5720.
- 2982 R. N.—EDWARD T. WISE, Beausale, Warwick, for Beausale Blossom 23rd.

Class 369.—Gloucestershire Old Spots Sows, born in 1931.

- 2991 I. (210.)—J. F. WRIGHT, Olton Farm, Solihull, for Solihull Lady Z.641, born Jan. 28; s. Solihull Buster 5858, d. Mitcheltrey Lady Z.227 by Hempstead Jim 1st 5586.
- 2988 II. (25.)—H. R. MCCRACKEN, Beara Farm, Plilton, Barnstaple, for Beara Selina Z.647, born Feb. 8; s. Thornbury Bandage 5804, d. Beara Sauce Z.425 by Ashford June Lad 5760.
- 2990 III. (23.)—SHERIFF & SONS, Lemsford, Welwyn Garden City, Herts, for Nashes Duchess 52nd Z.634, born Jan. 2; s. Pevensey Hero 5820, d. Nashes Duchess 44th Z.439 by Hempstead Spot 5619.
- 2992 R. N.—J. F. WRIGHT, for Solihull Lass 1st.

Essex.

Class 376.—Essex Boars, born in or before 1929.

- 2993 I. (210.)—J. R. TINNEY, Church End, Rickling, Newport, Essex, for Barling Janus 3671 (407), born June 29, 1929, bred by Kemsley & Kemsley, Great Wakering, Essex; s. Cressing Jay 6th 3499, d. Barling Minty 18776 by Barling Colonel 2793.

Class 377.—Essex Boars, born in 1930.

- 2996 I. (210. & R. N. for Champion.)—T. H. SOOON, Tanfield Tye, West Hanningfield, Chelmsford, for Cressing Grand Duke 3rd 3815 (479), born July 5, bred by A. J. Cousins, Cressing Lodge, Braintree; s. Rickling Duke 6th 3687, d. Cressing Grand Duchess 1st 20360.
- 2998 II. (25.)—J. R. TINNEY, Church End, Rickling, Newport, Essex, for Rickling Gay Lad 6th 3861 (459), born Feb. 15; s. Peadowns Gay Lad 3827, d. Rickling Fancy 4th 17570 by Rickling Reigner 6th 2521.
- 2994 III. (23.)—F. J. BOSWORTH, Greens Farm, Magdalen Laver, Ongar, for Laver Janus 1st 3803 (476), born Aug. 1; s. Barling Janus 3671, d. Laver Lively 19958 by Thorley Drummer 3409.

Class 378.—Essex Boars, born in 1931.

- 2999 I. (210.)—F. J. BOSWORTH, Greens Farm, Magdalen Laver, Ongar, for Laver Kaiser 1st 3845 (497), born Jan. 8; s. Roothing Kaiser 8th 3748, d. Laver Liveliness 19956 by Thorley Drummer 3409.
- 3001 II. (25.)—T. H. SOOON, Tanfield Tye, West Hanningfield, Chelmsford, for Tanfield Gay Lad 4th 3865 (505), born Jan. 2; s. Rickling Gay Lad 3rd 3693, d. Tanfield Apple 18914 by Galleywood Emperor 7th 2825.
- 3000 III. (23.)—KEMSLEY & KEMSLEY, Crouchmans Farm, Shoeburyness, for Barling Harbloom 3873 (509), born Jan. 14; s. Roothing Laughter 17th 3537, d. Barling Vera 19590 by Barling Colonel 2793.

Class 379.—Essex Breeding Sows, born in or before 1929.

- 3007 I. (210. & Champion.)—J. R. TINNEY, Church End, Rickling, Newport, Essex, for Rickling Charlotte 25th 19938 (1911), born Jan. 29, 1928, farrowed March 10; s. Cressing Angus 4th 1985, d. Rickling Charlotte 6th 11486 by Gosfield Scout 2nd 627.

¹ Perpetual Silver Challenge Cup given through the Gloucestershire Old Spots Pig Society for the best Gloucestershire Old Spots Pig.

² Perpetual Silver Challenge Cup given through the Gloucestershire Old Spots Pig Society for the best Sow.

³ Silver Champion Cup given by the Essex Pig Society for the best Pig.

- 3005 **II.** (#5).—T. H. SOCHON, Tanfield Tye, West Hanningfield, Chelmsford, for **Tanfield Concord** 20282 (2052), born Jan. 11, 1929, farrowed March 27; s. Peace King 3231, d. Ramsey Precious 14714 by Barling Sultan 1493.
 3003 **III.** (#3).—KEMSLEY & KEMSLEY, Crouchmans Farm, Shoeburyness, for **Barling Annie** 17880 (582), born July 19, 1926, farrowed Feb. 5; s. Crossing Powerful 1983, d. Barling Biddy 15948 by Crossing Duke 7th 2271.
 3004 **R. N.**—T. H. SOCHON, for **Tanfield Beatrice**.

Class 380.—Essex Sows, born in 1930.¹

- 3012 **I.** (#10).—T. H. SOCHON, Tanfield Tye, West Hanningfield, Chelmsford, for **Tanfield Beatrice** 2nd 20696 (2299), born Jan. 2; s. Peace King 3231, d. Tanfield Beatrice 19624 by Galleywood Emperor 7th 2825.
 3011 **II.** (#5).—KEMSLEY & KEMSLEY, Crouchmans Farm, Shoeburyness, for **Barling Thistabel** 20830 (2366), born Jan. 27; s. Crossing Jay 7th 3487, d. Barling Trustful 19602 by Pan Ernest 2693.
 3013 **III.** (#3).—T. H. SOCHON, for **Tanfield Ada** 2nd 20698 (2300), born Jan. 12; s. Peace King 3231, d. Tanfield Ada 18488 by Pan Ernest 2693.
 3015 **R. N.**—J. E. TINNEY, Church End, Rickling, Newport, Essex, for **Rickling Charlotte** 27th.
H. C.—3009. **C.**—3010.

Class 381.—Essex Sows, born in 1931.

- 3016 **I.** (#10).—F. J. BOSWORTH, Greens Farm, Magdalen Laver, Ongar, for **Laver Beauty** 20800 (2351), born Jan. 2; s. Roothing Kaiser 8th 3743, d. Laver Betake 20610 by Thorley Drummer 3409.
 3022 **II.** (#5).—J. E. TINNEY, Church End, Rickling, Newport, Essex, for **Rickling Treasure** 30th 20856 (2379), born Jan. 2; s. Barling Cadet 2797, d. Rickling Treasure 16th 18450 by Crossing Angus 4th 1985.
 3020 **III.** (#3).—T. H. SOCHON, Tanfield Tye, West Hanningfield, Chelmsford, for **Tanfield Bunny** 2nd 20810 (2356), born Jan. 7; s. Rickling Gay Lad 3rd 3693, d. Tanfield Bunny 19628 by Peace King 8231.
 2019 **R. N.**—KEMSLEY & KEMSLEY, Crouchmans Farm, Shoeburyness, for **Barling Polly**.
H. C.—3017. **C.**—3018.

Long White Lop-Eared.

Class 382.—Long White Lop-Eared Boars, born in or before 1929.

- 3024 **I.** (#10, Champion,² & R. N. for Champion,³)—GEORGE H. EUSTICE, Bezurrell, Gwinear, Hayle, Cornwall, for **Afton Gay Boy** 1122, born Jan. 15, 1926, bred by Pearse & Sons, Tonnes; s. Yealmpstone Sunday 958, d. Coryton Beauty 2663 by Coryton General 532.
 3027 **II.** (#5).—W. H. NEAL, Walreddon Farm, Tavistock, for **Yealmpstone Gay Boy** 3rd 1992, born May 17, 1929; s. Yealmpstone Gay Boy 2nd 1760, d. Yealmpstone Vanity 2nd 4885 by Axworthy Captain 1370.
 3026 **III.** (#3).—T. C. MARSHALL, Paramount, Ivybridge, Devon, for **Paramount Surveyor** 1882, born Jan. 6, 1929; Devonshire Ladder 1880, d. Colwell Beauty 2nd 5361 by Yealmpstone Ben 3rd 938.
 3024, 3050, 3051 **Gold Medal.**⁴—GEORGE H. EUSTICE, for **Afton Gay Boy**, Bezurrell Mona 10th and Bezurrell Mona 8th.
 3031, 3044, 3058 **R. N.** for **Gold Medal.**⁴—T. C. MARSHALL, for **Paramount Superior** 2nd, Colwell Beauty 2nd and Paramount Princess 6th.

Class 383.—Long White Lop-Eared Boars, born in 1930.

- 3031 **I.** (#10, & R. N. for Champion,³)—T. C. MARSHALL, Paramount, Ivybridge, Devon, for **Paramount Superior** 2nd 2194, born Jan. 4; s. Devonshire Ladder 1880, d. Colwell Princess 4th 5359 by Lukeland Hero 342.
 3032 **II.** (#5).—W. H. NEAL, Walreddon Farm, Tavistock, for **Yealmpstone Prince** 3rd 2196, born July 3; s. Devonshire Sportsman 2108, d. Godwell Beauty 8th 4859 by Yealmpstone Ben 3rd 938.
 3029 **III.** (#3).—GEORGE H. EUSTICE, Bezurrell, Gwinear, Hayle, Cornwall, for **Bezurrell Bacon Boy** 20th 2284, born July 3; s. Afton Gay Boy 1122, d. Bezurrell Mona 5573 by Erme Hero 1st 1056.
 3030 **R. N.**—HENRY J. KINGWELL, Great Aish, South Brent, Devon, for **Devonshire H. J. K.**

¹ Prizes given by the Essex Pig Society.

² Champion Silver Medal given by the National Long White Lop-Eared Pig Society for the best Boar.

³ The "Risingholme" Silver Challenge Cup given through the National Long White Lop-Eared Pig Society for the best Long White Lop-Eared Pig.

⁴ Gold Medal given by the National Long White Lop-Eared Pig Society for the best Group consisting of one Boar and two Sows, two of which must be bred by Exhibitor.

Class 384.—Long White Lop-Eared Boars, born in 1931.

- 3041 I. (210).—W. J. WESTLAKE, Godwell, Ivybridge, Devon, for Godwell Moonshine 2244, born Feb. 1; s. Devonshire Sportsman 2108, d. Godwell Gem 1st 6163 by Ipplepen Don 1312.
 3037 II. (25).—T. C. MARSHALL, Paramount, Ivybridge, Devon, for Paramount Duke 2292, born Jan. 12; s. Paramount Superior 2nd 2194, d. Devonshire Royal Duchess 6567.
 3039 III. (23).—CAPT. N. MILNE-HARROP, Garthgynan, Ruthin, North Wales, for Gwersyllt Lord Glascoed 8th 2278, born Feb. 6; s. Gwersyllt Lord Glascoed 1st 2018, d. Gwersyllt Beauty 1st 4595 by Yealmpstone Ben 3rd 938.
 3040 IV. (22).—W. H. NEAL, Walreddon Farm, Tavistock, for Yealmpstone Prince 4th 2290, born Jan. 15; s. Yealmpstone Gay Boy 3rd 1992, d. Godwell Beauty 8th 4859 by Yealmpstone Ben 3rd 938.

Class 385.—Long White Lop-Eared Breeding Sows, born in or before 1929.

- 3045 I. (210, Champion: & Champion).—CAPT. N. MILNE-HARROP, Garthgynan, Ruthin, North Wales, for Gwersyllt Beauty 2nd 5333, born Aug. 19, 1927, farrowed Feb. 8; s. Priory Masterpiece 1084, d. Godwell Beauty 5th 3763 by Ipplepen Sultan 552.
 3046 II. (25).—W. H. NEAL, Walreddon Farm, Tavistock, for Larcombe Butterfly 1st 5721, born Jan. 20, 1928, farrowed Jan. 19, bred by Mrs. Baker, Larcombe Farm, Blackawton, Devon; s. Ipplepen Don 1312, d. Godwell Butterfly 6th 4851 by Yealmpstone Ben 3rd 938.
 3044 III. (23).—T. C. MARSHALL, Paramount, Ivybridge, Devon, for Colwell Beauty 2nd 5361, born March 2, 1927, farrowed Jan. 3, bred by W. Down, Colwell Farm, Egguckland; s. Yealmpstone Ben 3rd 938, d. Colwell Princess 4th 5359 by Lukealand Hero 342.
 3048 E. N.—W. J. WESTLAKE, Godwell, Ivybridge, Devon, for Godwell Gem 1st 6163, born March 17, 1929, farrowed Feb. 1; s. Ipplepen Don 1312, d. Godwell Primrose 4th 5639 by Godwell Sultan 2nd 1114.

Class 386.—Long White Lop-Eared Sows, born in 1930.*

- 3055 I. (210).—W. J. WESTLAKE, Godwell, Ivybridge, Devon, for Godwell Duchess 6319, born Jan. 2; s. Folly Merryman 1420, d. Godwell Primrose 4th 5639 by Godwell Sultan 2nd 1114.
 3050 II. (25).—GEORGE H. EUSTON, Bezurrell, Gwinear, Hayle, Cornwall, for Bezurrell Mona 16th 6735, born July 3; s. Afton Gay Boy 1122, d. Bezurrell Mona 5573 by Erme Hero 1st 1056.
 3053 III. (23).—W. H. NEAL, Walreddon Farm, Tavistock, for Yealmpstone Daisy 6363, born Jan. 17; s. Woods Masterpiece 2nd 1360, d. Larcombe Butterfly 3rd 5725 by Yealmpstone Ben 3rd 938.
 3051 E. N.—GEORGE H. EUSTON, for Bezurrell Mona 6th.

Class 387.—Long White Lop-Eared Sows, born in 1931.

- 3058 I. (210, & E. N. for Champion).—T. C. MARSHALL, Paramount, Ivybridge, Devon, for Paramount Princess 6th 6749, born Jan. 3; s. Paramount Superior 2nd 2194, d. Colwell Beauty 2nd 5361 by Yealmpstone Ben 3rd 938.
 3057 II. (25).—GEORGE H. EUSTON, Bezurrell, Gwinear, Hayle, Cornwall, for Bezurrell Alacrity 16th 6745, born Jan. 3; s. Priory Millman 11th 2078, d. Bezurrell Alacrity 5th 5851 by Afton Gay Boy 1122.
 3056 III. (23).—GEORGE H. EUSTON, for Bezurrell Alacrity 15th 6743, born Jan. 3; s. Priory Millman 11th 2078, d. Bezurrell Alacrity 5th 5851 by Afton Gay Boy 1122.
 3060 E. N.—W. H. NEAL, Walreddon Farm, Tavistock, for Yealmpstone Beauty 2nd.

POULTRY.

By "Cock" and "Hen" are meant birds hatched previous to January 1, 1931; and by "Cockerel" and "Pullet" are meant birds hatched in 1931.

The Prizes in each Class are as follows: First Prize, 40s. Second Prize, 30s. Third Prize, 20s. Fourth Prize, 10s. Fifth Prize, 5s.

Special Prizes were given in the Poultry Classes by the following Clubs: Dorking, Sussex, Columbian Wyandotte, British Black Barnevelder, British Barnevelder, Welsummer, and Campine.

"P.F." stands for "Poultry Farm."

Class 388.—Dorking Cocks or Cockerels.

- 1 I. & Special.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 2 II. and 4 III.—A. J. MAJOR, Ditton, Langley, Bucks.
 3 E. N.—SAMUEL OATY, Chacewater, Truro.

* The "Risingholme" Silver Challenge Cup given through the National Long White Lop-Eared Pig Society for the best Long White Lop-Eared Pig.

* Champion Silver Medal given by the National Long White Lop-Eared Pig Society for the best Sow.

* Prizes given by the National Long White Lop-Eared Pig Society.

Class 389.—Dorking Hens or Pullets.

- 8 I. & R. N. for Special.—SAMUEL OATEY, Chacewater, Truro.
 7 II.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 9 III.—A. J. MAJOR, Ditton, Langley, Bucks.
 5 R. N.—MRS. EMILY MILLS, Woodford Hall, Milton Damerel, Devon.
 H. C.—6. C.—16.

Class 390.—Croad Langshan Cocks or Cockerels.

- 10 I.—C. F. BARKER, 51, Waverley, Brays Lane, Coventry.
 19 II.—EDWARD CROCKER, The Grange, Euxton, Chorley, Lancs.
 21 III. and 15 V.—MRS. EMILY MILLS, Woodford Hall, Milton Damerel, Devon.
 14 IV.—CAPT. H. C. FRANKLIN, M.C., The Avenue, Ampthill.
 11 R. N.—HAROLD CHURCH, Godshill, Fordingbridge, Hants.
 H. C.—17, 20. C.—16.

Class 391.—Croad Langshan Hens or Pullets.

- 26 I. and 31 III.—MRS. EMILY MILLS, Woodford Hall, Milton Damerel, Devon.
 28 II.—HARRY FOX, International Poultry Yards, Matlock.
 28 IV.—HAROLD CHURCH, Godshill, Fordingbridge, Hants.
 24 V. and 30 R. N.—C. F. BARKER, 51, Waverley, Brays Lane, Coventry.
 H. C.—35, 36. C.—22, 32.

Class 392.—Brahma or Cochín Cocks or Cockerels.

- 40 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 44 II.—H. HOUGH-WATSON, Braystones House, Beckermat, Cumberland.
 39 III.—NORMAN M. GRANT, Mill Lane P.F., Copthorne, Sussex.
 45 R. N.—COL. R. S. WILLIAMSON, The Grange, Rawnsley, Stafford.
 H. C.—38, 41. C.—43.

Class 393.—Brahma or Cochín Hens or Pullets.

- 49 I.—H. HOUGH-WATSON, Braystones House, Beckermat, Cumberland.
 48 II.—NORMAN M. GRANT, Mill Lane P.F., Copthorne, Sussex.
 47 III. and 50 R. N.—COL. R. S. WILLIAMSON, The Grange, Rawnsley, Stafford.

Class 394.—Red Sussex Cocks.

- 52 I. & Special, and 56 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 51 III.—CHARLES HARRY, Argos Hill, Rotherfield, Sussex.
 55 R. N.—JAMES DUMBLETON, Sheen Croft Farm, Didcot, Berks.
 H. C.—58. C.—57.

Class 395.—Red Sussex Hens.

- 62 I & R. N. for Special.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 63 II.—JAMES DUMBLETON, Sheen Croft Farm, Didcot, Berks.
 64 III. and 59 R. N.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 H. C.—60. C.—61.

Class 396.—Red Sussex Cockerels.

- 66 I. and 68 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.

Class 397.—Red Sussex Pullets.

- 70 I. and 72 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 71 III. and 73 R. N.—JAMES DUMBLETON, Sheen Croft Farm, Didcot, Berks.

Class 398.—Light Sussex Cocks.

- 78 I, Special, & Cup.¹—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 76 II. and 80 III.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 75 R. N.—MRS. M. A. GRANT, Kirby Hall, Horton Kirby, Kent.
 H. C.—79. C.—74.

Class 399.—Light Sussex Hens.

- 82 I. and 89 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 88 III.—MRS. M. A. GRANT, Kirby Hall, Horton Kirby, Kent.
 84 IV.—MISS M. V. LARKWORTHY, Cooper's Bridge, Bramshott, Liphook.
 86 R. N.—CARL HOLMES, Clover Top Farm, Coldcote, Hitchin.
 H. C.—83, 85. C.—90.

¹ The "Crawshay Memorial" Cup and a Special Prize given through the Sussex Poultry Club for the best Light Sussex.

Class 400.—Light Sussex Cockerels.

- 96 I., E. N. for Special, & E. N. for Cup.¹—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 92 II. and 99 III.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 95 IV.—COL. D. A. CHAYTOR, Pooley Hall, Poleaworth, Tamworth.
 101 E. N.—HENRY UNDERWOOD, Mowshurst P.F., Edenbridge.
 H. C.—97, 100. C.—91.

Class 401.—Light Sussex Pullets.

- 104 I. and 111 III.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 107 II.—A. H. SHAW, Great Ouseburn, York.
 113 IV.—COL. D. A. CHAYTOR, Pooley Hall, Poleaworth, Tamworth.
 110 E. N.—HENRY UNDERWOOD, Mowshurst P.F., Edenbridge.
 H. C.—105, 112. C.—106, 114.

Class 402.—Speckled Sussex Cocks.

- 115 I. & Special, and 117 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 116 III.—R. P. PERCIVAL, Shuttington Hall, Tamworth.
 118 E. N.—A. W. H. LOVELESS, Priors, Keston, Kent.

Class 403.—Speckled Sussex Hens.

- 119 I. & E. N. for Special, and 121 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 120 III.—R. P. PERCIVAL, Shuttington Hall, Tamworth.

Class 404.—Speckled Sussex Cockerels.

- 122 I. and 123 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.

Class 405.—Speckled Sussex Pullets.

- 124 I. and 126 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 125 III.—A. W. H. LOVELESS, Priors, Keston, Kent.

Class 406.—Brown Sussex Cocks or Cockerels.

- 127 I. & E. N. for Special, 129 II. and 131 III.—CHARLES HARDY, Argos Hill, Rotherfield.
 128 E. N.—CARL HOLMES, Clover Top Farm, Codicote, Hitchin.
 H. C.—130.

Class 407.—Brown Sussex Hens or Pullets.

- 132 I. & Special, and 136 II.—MRS. M. A. GRANT, Kirby Hall, Horton Kirby, Kent.
 137 III. and 133 E. N.—CHARLES HARDY, Argos Hill, Rotherfield, Sussex.
 H. C.—134. C.—135.

Class 408.—Buff Sussex Cocks or Cockerels.

- 138 I. & E. N. for Special.—ARTHUR COOKE, 25, Halmergate, Spalding.

Class 409.—Buff Sussex Hens or Pullets.

- 139 I. & Special.—MISS M. G. NEWMAN, High Hurstwood, Uckfield.

Class 410.—White Sussex Cocks or Cockerels.

- 140 I. & Special, and 142 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.

Class 411.—White Sussex Hens or Pullets.

- 144 I. & E. N. for Special, and 147 II.—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 146 III.—CARL HOLMES, Clover Top Farm, Codicote, Hitchin.

Class 412.—White Wyandotte Cocks or Cockerels.

- 149 I. and 153 E. N.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 151 II.—HUGH GUNN, Castle Villa P.F., Gloucester.
 154 III.—WILLIAM WATSON, Longacre, Chapel-en-le-Frith.
 H. C.—148. C.—155.

Class 413.—White Wyandotte Hens or Pullets.

- 161 I.—HUGH GUNN, Castle Villa P.F., Gloucester.
 158 II. and 162 E. N.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 156 III.—T. O. BURWELL, Orchards, Milton Bryan, Bletchley.
 H. C.—157. C.—159.

¹ The "Crawshaw Memorial" Cup and a Special Prize given through the Sussex Poultry Club for the best Light Sussex.

Class 414.—Gold or Silver Laced Wyandotte Cocks or Cockerels.

- 165 I.—HERBERT SPENSLEY, Oaks Farm, Menston-in-Wharfedale.
 166 II.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 164 III.—WM. RICHARDSON, 40, Bootham Crescent, York.

Class 415.—Gold or Silver Laced Wyandotte Hens or Pullets.

- 169 I.—F. W. TURNER, Southbank, Bucknall, Stoke-on-Trent.
 167 II.—HERBERT SPENSLEY, Oaks Farm, Menston-in-Wharfedale.

Class 416.—Columbian Wyandotte Cocks.

- 170 I. & Spoon,¹ and 172 II.—FRED BROWN, Woodside, Grimscars, Huddersfield.
 171 III.—SAMUEL T. READ, 40, China Street, Bulwell, Nottingham.

Class 417.—Columbian Wyandotte Hens.

- 176 I. & Cup,¹ and 174 II.—FRED BROWN, Woodside, Grimscars, Huddersfield.
 175 III.—SAMUEL T. READ, 40, China Street, Bulwell, Nottingham.
 177 R. N.—W. HARRIS, Little Gables, Keynsham, Somerset.
 H. C.—173.

Class 418.—Columbian Wyandotte Cockerels.

- 179 I. & R. N. for Spoon,¹ and 182 R. N.—FRED BROWN, Woodside, Grimscars, Huddersfield.
 178 II.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 181 R. N.—JOHN F. COOKS, Ware Park, Ware, Herts.
 H. C.—180.

Class 419.—Columbian Wyandotte Pullets.

- 188 I. & R. N. for Cup,¹—THE REV. MARQUIS OF NORMANBY, Mulgrave Estate Office, Lythe Whitby.
 184 II.—W. HARRIS, Little Gables, Keynsham, Somerset.
 187 III.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 186 R. N.—JOHN F. COOKS, Ware Park, Ware, Herts.
 H. C.—185, 190.

Class 420.—Wyandotte Cocks or Cockerels, any other colour.

- 192 I.—FRED ARGO, Bructor, by Inverurie.
 196 II.—THOMAS SIDDONS, Tamworth Road, Ashby-de-la-Zouch.
 197 III.—J. G. MORTEN, Pentrich, Derby.
 199 IV. and 193 R. N.—E. P. PERCIVAL, Shuttington House, Tamworth.
 H. C.—191. C.—194.

Class 421.—Wyandotte Hens or Pullets, any other colour.

- 203 I.—WALTER FOULDS, Clydesdale, Kirby Muxloe, Leicester.
 201 II.—ROGER HARGREAVES, Abbeydene P.F., Whalley, Lancs.
 200 III.—J. A. BOARDLEY, Slyne Road, Lancaster.
 202 R. N.—WALTON MAUGHAN, Ing Head House, Holmfirth, Yorks.
 H. C.—204. C.—205.

Class 422.—Buff Orpington Cocks or Cockerels.

- 207 I.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 206 II.—W. J. GOLDING, Bowens, Penshurst, Kent.
 209 III.—ABBOT BROS., Thuxton, Norfolk.

Class 423.—Buff Orpington Hens or Pullets.

- 211 I.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 210 II.—W. J. GOLDING, Bowens, Penshurst, Kent.

Class 424.—Black Orpington Cocks or Cockerels.

- 217 I. and 212 II.—JOHN BURDETT, Lake Bank Terrace, Wingate.
 214 III.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 213 R. N.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
 H. C.—216. C.—215.

Class 425.—Black Orpington Hens or Pullets.

- 222 I.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
 224 II.—JOHN BURDETT, Lake Bank Terrace, Wingate.

¹ The "Goddard" Visiting Cup given by the Columbian Wyandotte Club for the best Columbian Wyandotte, and a Silver Spoon for the best Columbian Wyandotte of opposite sex.

- 218 III.—T. R. KEMP, Ravenbank, Lymm, Warrington.
220 R. N.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
H. C.—221. C.—223.

Class 426.—Orpington Cocks or Cockerels, any other colour.

- 229 I. and 227 R. N.—H. WHITLEY, Primley, Paignton.
225 II.—W. H. COOK (ORPINGTON), Cook's P.F., Orpington.
228 III.—J. COOKE, Littlemoor, Queensbury, Bradford.

Class 427.—Orpington Hens or Pullets, any other colour.

- 231 I.—J. D. KAY, Stetchworth, Newmarket.

Class 428.—Australorp Cocks or Cockerels.

- 236 I.—J. W. FAWCETT & SON, 7, Mann Square, Thurnscoe, Rotherham.
232 II.—LADY BURKE, Henley Pedigree P.F., Henley-on-Thames.
233 III.—J. H. BEEVER, Wansford, Driffield.
235 R. N.—ROY N. CORNER, Wellington P.F., near Hereford.
H. C.—238.

Class 429.—Australorp Hens or Pullets.

- 244 I.—WILLIAM BOLT, The Beeches, Tanworth-in-Arden.
242 II.—J. H. BEEVER, Wansford, Driffield.
240 III.—LADY BURKE, Henley Pedigree P.F., Henley-on-Thames.
243 R. N.—G. CLAPHAM, Bowbrook, Shrewsbury.
H. C.—241.

Class 430.—Black Barnevelder Cocks or Cockerels.

- 245 I. & Special.—R. FLETCHER HEARNshaw, Fox Hill, Burton Joyce, Nottingham.
251 II. & R. N. for Special.—MRS. HUNTINGTON, Wellesbourne House, Warwick.
249 III.—WALTER C. PAYNE, The Chalet, Weston, Stevenage.
246 R. N.—TOM CLOUGH, The P.F., Gawsorth, Macclesfield.

Class 431.—Black Barnevelder Hens or Pullets.

- 254 I. & Special.—TOM CLOUGH, The P.F., Gawsorth, Macclesfield.
257 II. & R. N. for Special.—HARRY FOX, International Poultry Yards, Matlock.
256 III.—R. FLETCHER HEARNshaw, Fox Hill, Burton Joyce, Nottingham.
258 IV.—J. E. COWWILL, Silkstone Main P.F., Silkstone Common, Barnsley.
259 R. N.—W. H. DUTTON, The Villa, Hatherton, Nantwich.

Class 432.—Barnevelder Cocks or Cockerels, any other colour.

- 263 I. & Special, and 269 II. & R. N. for Special.—NORMAN M. GRANT, Mill Lane P.F., Copthorne, Sussex.
268 III. and 271 IV.—MRS. HUNTINGTON, Wellesbourne House, Warwick.
267 R. N.—THE REV. J. E. T. HUGHES, Radford Vicarage, Leamington Spa.
H. C.—266.

Class 433.—Barnevelder Hens or Pullets, any other colour.

- 274 I. & Special, and 279 III.—NORMAN M. GRANT, Mill Lane P.F., Copthorne, Sussex.
275 II. & R. N. for Special.—W. A. SLOCOCK, Goldsworth Orchard, St. John, Woking.
276 IV.—J. E. COWWILL, Silkstone Main P.F., Silkstone Common, Barnsley.
272 R. N.—MISS MUNRO, Hilden, Ottery St. Mary.
H. C.—273.

Class 434.—Welsummer Cocks or Cockerels.

- 283 I. & Special.—GRELLET & MOSS, 23, Lancaster Road, Hitchin.
281 II. & R. N. for Special.—ERNEST STEVENS, 55, The Oval, Godalming.
286 III.—MRS. K. WOOD, The Mount, Crockenhill, Swanley Junction.
287 IV.—J. E. COWWILL, Silkstone Main P.F., Silkstone Common, Barnsley.
289 R. N.—W. CEOL ROBINSON, Inglesfield, Dean Row, Wilmslow.
H. C.—282.

Class 435.—Welsummer Hens or Pullets.

- 301 I. & Special.—ROGER HARGREAVES, Abbeydene P.F., Whalley, Lancs.
292 I. & R. N. for Special.—GRELLET & MOSS, 23, Lancaster Road, Hitchin.
302 III. and 296 V.—W. CEOL ROBINSON, Inglesfield, Dean Row, Wilmslow.
291 IV.—J. E. COWWILL, Silkstone Main P.F., Silkstone Common, Barnsley.
300 R. N.—WALTER G. COLES, Barnstyes, Oxted.
H. C.—298.

Class 436.—British Rhode Island Red Cocks.

- 308 I.—G. EXELBY, 97, Poppleton Road, York.
 309 II.—RICHARD MOORE, Hammer House, Sutton Bridge, Wisbech.
 311 III.—G. H. MUZZLEWHITE, Redlands, Tavistock.
 305 R. N.—W. R. ABBEY & SON, Croft Farm, Hessay, York.
 H. C.—304. C.—307.

Class 437.—British Rhode Island Red Hens.

- 315 I.—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls P.F., Romsey, Hants.
 313 II.—FRANK H. PAGE, Woodlands, Great Horkealey, Colchester.
 312 III.—A. J. LUCAS, Poplar Farm, Bradford-on-Avon.
 H. C.—314. C.—319.

Class 438.—British Rhode Island Red Cockerels.

- 331 I, 334 III, and 320 R. N.—RICHARD MOORE, Hammer House, Sutton Bridge, Wisbech.
 332 II.—ERNEST E. PICKERSGILL, Norwood, Tanshelf, Pontefract.
 323 IV.—W. R. ABBEY & SON, Croft Farm, Hessay, York.
 325 V.—FRANK H. PAGE, Woodlands, Great Horkealey, Colchester.
 H. C.—327. C.—330.

Class 439.—British Rhode Island Red Pullets.

- 358 I, 336 II, and 350 R. N.—RICHARD MOORE, Hammer House, Sutton Bridge, Wisbech.
 341 III.—FRANK H. PAGE, Woodlands, Great Horkealey, Colchester.
 340 IV.—W. R. ABBEY & SON, Croft Farm, Hessay, York.
 342 V.—MISS M. V. LARKWORTHY, Cooper's Bridge, Bramshott, Liphook.
 H. C.—345. C.—339.

Class 440.—Barred Plymouth Rock Cocks.

- 362 I.—JOHN TAYLOR, Heath Farm, Tiptree.
 363 II.—RICHARD CAPE, Black Lake P.F., Egham.
 361 III.—W. W. W. BUTT, Eastfield P.F., North Thoresby, Lincs.
 360 R. N.—R. GARLICK, Kirkby Lonsdale.
 H. C.—359.

Class 441.—Barred Plymouth Rock Hens.

- 364 I.—MRS. W. G. JACKA, Ninnis, Germoe, Marazion.
 367 II.—W. W. W. BUTT, Eastfield P.F., North Thoresby, Lincs.
 366 III.—EDWIN MARSHALL, Hollyhurst, Gregory Street, Lenton, Nottingham.
 368 R. N.—T. H. NELSON, Kirkby Lonsdale.
 H. C.—369. C.—365.

Class 442.—Barred Plymouth Rock Cockerels.

- 377 I. and 373 R. N.—GEORGE WOODRWS, Lindeth Lodge, Silverdale, Carnforth.
 375 II.—JOHN TAYLOR, Heath Farm, Tiptree.
 376 III.—RICHARD CAPE, Black Lake P.F., Egham.
 371 IV.—R. GARLICK, Kirkby Lonsdale.
 H. C.—379. C.—370.

Class 443.—Barred Plymouth Rock Pullets.

- 381 I. and 386 III.—GEORGE WOODRWS, Lindeth Lodge, Silverdale, Carnforth.
 388 II.—JOHN TAYLOR, Heath Farm, Tiptree.
 382 R. N.—J. W. HAYTON, Levensfield, Silverdale, Carnforth.
 H. C.—385. C.—380.

Class 444.—Buff Plymouth Rock Cocks or Cockerels.

- 389 I.—W. W. W. BUTT, Eastfield P.F., North Thoresby, Lincs.
 388 II.—CAPT. H. P. LESCHALLAS, Mill P.F., Prestbury, Cheltenham.
 391 III.—RICHARD CAPE, Black Lake P.F., Egham.
 390 R. N.—JOHN TAYLOR, Heath Farm, Tiptree.
 H. C.—387.

Class 445.—Buff Plymouth Rock Hens or Pullets.

- 392 I.—JAMES BATEMAN, MIlnthorpe.
 399 II.—RICHARD CAPE, Black Lake P.F., Egham.
 398 III.—JOHN TAYLOR, Heath Farm, Tiptree.
 395 R. N.—JOHN HEALEY, Kiln Bank, Croft, Market Drayton.
 H. C.—394. C.—397.

Class 446.—Plymouth Rock Cocks or Cockerels, any other colour.

- 404 I.—JOHN WHARTON, Honeycott Farm, Hawes, Yorks.
 403 II.—JOHN TAYLOR, Heath Farm, Tiptree.

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- 400 III.—W. R. ABBEY & SON, Croft Farm, Hessay, York.
 401 R. N.—NORMAN M. GRANT, Mill Lane P.F., Copthorne, Sussex.
 H. C.—402. C.—405.

Class 447.—*Plymouth Rock Hens or Pullets, any other colour.*

- 406 I.—W. W. W. BUTT, Eastfield P.F., North Thoresby, Lincs.
 411 II.—JOHN WHARTON, Honeycott Farm, Hawes, Yorks.
 407 III.—JOHN TAYLOR, Heath Farm, Tiptree.
 408 R. N.—RICHARD CAPE, Black Lake P.F., Egham.
 H. C.—409. C.—410.

Class 448.—*Old English Game Black-Red Cocks or Cockerels.*

- 413 I. and 417 III.—C. N. BELBIN, Nortonthorpe Hall, Huddersfield.
 412 II.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 416 R. N.—R. S. MARSDEN, Chatburn, Clitheroe.
 H. C.—414.

Class 449.—*Old English Game Clay or Wheaten Hens or Pullets.*

- 421 I.—R. S. MARSDEN, Chatburn, Clitheroe.
 419 II.—A. SLATER, The Old Vicarage, Snythe, Whitby.
 420 III.—C. N. BELBIN, Nortonthorpe Hall, Huddersfield.
 418 R. N.—J. H. BAKER & SON, Windyash, Barnstaple.

Class 450.—*Old English Game Cocks or Cockerels, any other colour.*

- 426 I.—R. S. MARSDEN, Chatburn, Clitheroe.
 427 II.—C. N. BELBIN, Nortonthorpe Hall, Huddersfield.
 422 III.—S. V. GILBERT, S. Caroline Row, Ventonleague, Hayle.
 428 IV.—DR. W. E. BARKER, Hill Crest, Clitheroe.
 429 R. N.—A. SLATER, The Old Vicarage, Lythe, Whitby.
 H. C.—423. C.—430.

Class 451.—*Old English Game Hens or Pullets, any other colour.*

- 432 I.—DR. W. E. BARKER, Hill Crest, Clitheroe.
 437 II.—H. WHITLEY, Primley, Pailinton.
 435 III. and 438 R. N.—R. S. MARSDEN, Chatburn, Clitheroe.
 H. C.—431, 436. C.—434.

Class 452.—*Indian Game Cocks or Cockerels.*

- 444 I.—J. H. BAKER & SON, Windyash, Barnstaple.
 445 II.—R. S. MARSDEN, Chatburn, Clitheroe.
 440 III.—W. G. BRENT, Warrens Park, Congdon Shop, Launceston.
 442 R. N.—CHLOE BRENT, Clampt, Callington.
 H. C.—446.

Class 453.—*Indian Game Hens or Pullets.*

- 447 I.—C. N. BELBIN, Nortonthorpe Hall, Huddersfield.
 445 II. and 448 IV.—J. H. BAKER & SON, Windyash, Barnstaple.
 453 III.—E. LAWRENSEN, Greenbank Farm, Norcott Brook, Warrington.
 451 R. N.—MISS M. V. LARKWORTHY, Cooper's Bridge, Bramshott, Liphook.
 H. C.—449.

Class 454.—*Minorca Cocks or Cockerels.*

- 459 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 460 II.—S. H. GRIFFIN, Inglenook, Sand Bay, Weston-super-Mare.
 457 III.—J. H. KNOWLES-MORGAN, 33, Clarendon Square, Leamington Spa.
 458 R. N.—ABBOT BROS., Thuxton, Norfolk.

Class 455.—*Minorca Hens or Pullets.*

- 462 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 465 II. and 461 III.—S. E. PARKER, 466, Bloxwich Road, Leamore, Walsall.
 463 R. N.—J. H. KNOWLES-MORGAN, 33, Clarendon Square, Leamington Spa.
 H. C.—464. C.—466.

Class 456.—*Leghorn Cocks or Cockerels, any colour.*

- 469 I.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
 470 II.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 471 III.—E. W. KEEN, The Factory, Castle Eden.
 467 R. N.—JOSEPH LOMAX, Ardna-Craig, View Road, Rainhill.
 H. C.—468.

Class 457.—Leghorn Hens or Pullets, any colour.

- 475 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 474 II. and 476 III.—JOSEPH LOMAX, Ardna-Craig, View Road, Rainhill.
 473 R. N.—MRS. FRANK BUNKER, Boarscroft, Long Marston, Tring.
 H. C.—472.

Class 458.—Ancona Cocks or Cockerels.

- 480 I.—GEORGE GOODALL, Christleton, Chester.
 477 II.—W. W. DRIVER, Stapleton House, Fleckney, Leicester.
 481 III.—J. H. BAKER & SON, Windyash, Barnstaple.
 479 R. N.—JOHN J. DENT, Whitehall, Maybole.
 H. C.—478.

Class 459.—Ancona Hens or Pullets.

- 485 I.—GEORGE GOODALL, Christleton, Chester.
 482 II.—T. DAVIES, Llanddewi, Llandysul.
 484 III.—W. W. DRIVER, Stapleton House, Fleckney, Leicester.
 483 R. N.—JAMES P. BLEAZARD, New Close, Downham, Clitheroe.
 H. C.—487. C.—486.

Class 460.—Campine Cocks or Cockerels.

- 488 I. & R. N. for Special.—DAVID J. JONES, Tycoch Farm, Ammanford.
 491 II.—W. A. SLOCOCK, Goldsworth Orchard, St. John, Woking.
 490 III.—JOHN S. APPLETON, 74, Arden Street, Earlsdon, Coventry.
 489 R. N.—MISS M. E. RAGE, 114, Church Road, Upper Norwood, London, S.E.19.

Class 461.—Campine Hens or Pullets.

- 497 I. & Special, and 494 II.—JOHN S. APPLETON, 74, Arden Street, Earlsdon, Coventry.
 496 III.—W. A. SLOCOCK, Goldsworth Orchard, St. John, Woking.
 495 R. N.—MISS M. E. RAGE, 114, Church Road, Upper Norwood, London, S.E.19.
 H. C.—493, 498. C.—492.

Class 462.—Bresse Cocks or Cockerels, any colour.

- 500 I.—ERNEST STEVENS, 55, The Oval, Godalming.
 502 II.—R. S. MARSDEN, Chatburn, Clitheroe.
 501 III.—MRS. W. A. REEVES, Norton Ferris, Kilmington, Frome.
 499 R. N.—LADY BURKE, Henley Pedigree P.F., Henley-on-Thames.
 H. C.—503.

Class 463.—Bresse Hens or Pullets, any colour.

- 507 I.—MRS. W. A. REEVES, Norton Ferris, Kilmington, Frome.
 504 II.—R. S. MARSDEN, Chatburn, Clitheroe.
 505 III. and 508 R. N.—ERNEST STEVENS, 55, The Oval, Godalming.
 H. C.—506.

Class 464.—White Silkie Cocks or Cockerels.

- 510 I.—MRS. WATTS, Haslington Hall, Crewe.
 511 II.—MR. AND MRS. H. W. HALL, The Gables, Ruyton-XI-Towns, Shrewsbury.

Class 465.—White Silkie Hens or Pullets.

- 513 I.—MRS. WATTS, Haslington Hall, Crewe.
 518 II. and 514 III.—MR. AND MRS. H. W. HALL, The Gables, Ruyton-XI-Towns, Shrewsbury.
 512 R. N.—G. W. HASSALL, 293, Bristol Road, Edgbaston.
 H. C.—516. C.—517.

Class 466.—Silkie Cocks, Cockerels, Hens or Pullets, any other colour.

- 524 I. and 529 IV.—MR. AND MRS. H. W. HALL, The Gables, Ruyton-XI-Towns, Shrewsbury.
 523 II.—MASTER DAVID DRAFER, 99, Boundary Road, London, N.W.8.
 528 III.—MRS. A. D. WATSON, Church Mead, Pirbright.
 520 R. N.—W. W. GREEN, Landsdowns House, Nether Whitacre, Warwickshire.
 H. C.—521, 526. C.—526.

Class 467.—Cocks, any other distinct variety, except Bantams.

- 530 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead, Hampshire.
 531 II.—R. FLETCHER HEARNSEAW, Fox Hill, Burton Joyce, Nottingham. Soots Grey.
 537 III.—JOSEPH PICKERILL, Moorside, Madeley, Crewe. Langshan.
 535 IV.—SAM MARSON, 20, Bar Lane, Bolton. Buff-laced Polish.

- 539 V.—J. H. BAKER & SON, Windyash, Barnstaple. Jubilee Game.
540 E. N.—ABBOT BROS., Thuxton, Norfolk. Andalusian.
H. C.—541. C.—533.

Class 468.—Cockerels, any other distinct variety, except Bantams.

- 546 I.—H. HOUGH-WATSON, Braystones House, Beckermest. Polish.
547 II.—J. H. BAKER & SON, Windyash, Barnstaple. Malay.
544 III.—H. HEATH, Pickford P.F., Bakewell. Redcap.
543 E. N.—JOHN F. STOUT, Thurnham, Hensingham, Whitehaven. Old English Pheasant Fowl.

Class 469.—Hens, any other distinct variety, except Bantams.

- 557 I.—J. H. BAKER & SON, Windyash, Barnstaple. Jubilee Game.
553 II.—JOSEPH PICKERILL, Moorside, Madeley, Crewe. Langshan.
556 III.—H. HOUGH-WATSON, Braystones House, Beckermest. Polish.
551 IV.—HARRY FOX, International Poultry Yards, Matlock. Redcap.
550 E. N.—A. J. MAJOR, Ditton, Langley, Bucks. Scots Dumble.
H. C.—552. C.—558.

Class 470.—Pullets, any other distinct variety, except Bantams.

- 564 I.—R. FLETCHER HEARNshaw, Fox Hill, Burton Joyce, Nottingham. Scots Grey.
561 II.—J. H. BAKER & SON, Windyash, Barnstaple. Malay.
565 III.—JOSEPH PICKERILL, Moorside, Madeley, Crewe. Langshan.
562 E. N.—H. HOUGH-WATSON, Braystones House, Beckermest. Polish.
H. C.—560. C.—568.

Class 471.—Utility Poultry. White Wyandotte Cocks or Cockerels.

- 571 I.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
573 II. and 567 IV.—R. MURRAY MOLESWORTH, Normory P.F., Great Bookham.
569 III.—RICHARD MOORE, Hammer House, Sutton Bridge, Wisbech.
576 V.—HUGH GUNN, Castle Villa P.F., Gloucester.
570 E. N.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
H. C.—566.

Class 472.—Utility Poultry. White Wyandotte Hens or Pullets.

- 589 I.—HUGH GUNN, Castle Villa P.F., Gloucester.
585 II.—GEORGE BLUNDELL, Newstead, Catforth, Preston.
579 III. and 584 E. N.—R. MURRAY MOLESWORTH, Normory P.F., Great Bookham.
580 IV.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
582 V.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
H. C.—581. C.—590, 591.

Class 473.—Utility Poultry. White Leghorn Cocks or Cockerels.

- 596 I.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
595 II.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
597 III.—MR. AND MRS. ALFRED SCHURROFF, Oldwych House, Chadwick End, Knowle, Warwickshire.
598 E. N.—R. & E. CHARTERIS, LTD., Chobham, Woking.

Class 474.—Utility Poultry. White Leghorn Hens or Pullets.

- 600 I.—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
599 II. and 608 E. N.—MISS HELEN BAYLIS, Welford Pastures, Stratford-on-Avon.
602 III.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
609 IV.—R. & E. CHARTERIS, LTD., Chobham, Woking.
603 V.—F. J. ONSHIRE, 22, Wharf Road, Grantham.
H. C.—607. C.—605.

Class 475.—Utility Poultry. Black Leghorn Cocks or Cockerels.

- 614 I.—JOHN A. DEWAR, Homestall P.F., East Grinstead.
613 II.—W. J. V. SHARLE, 9, Walton Road, East Molesey.
612 III.—J. E. RUBERY, The Shrubby, Alvechurch, Birmingham.
611 E. N.—LIEUT.-COL. G. E. B. PATTEN, Brookhurst, The Mount, Shrewsbury.

Class 476.—Utility Poultry. Black Leghorn Hens or Pullets.

- 617 I.—W. J. V. SHARLE, 9, Walton Road, East Molesey.
616 II.—LIEUT.-COL. G. E. B. PATTEN, Brookhurst, The Mount, Shrewsbury.
615 III.—J. E. RUBERY, The Shrubby, Alvechurch, Birmingham.

Class 477.—Utility Poultry. British Rhode Island Red Cocks or Cockerels.

- 628 I.—J. H. BAKER & SON, Windyash, Barnstaple.
621 II.—W. E. ABBEY & SON, Croft Farm, Hessay, York.

Awards of Poultry Prizes at Warwick, 1931.

- 619 **III.** and 626 **V.**—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls P.F., Romsey.
 627 **IV.**—A. L. TAYLOR, 80, Musters Road, West Bridgford, Nottingham.
 625 **R. N.**—W. H. L. HUMPHREY, Grassmere Poultry Yards, Banwell.
H. C.—618. **C.**—623, 630.

Class 478.—Utility Poultry. British Rhode Island Red Hens or Pullets.

- 632 **I.** and 641 **IV.**—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls P.F., Romsey.
 634 **II.**—RICHARD MOORE, Hammer House, Sutton Bridge, Wisbech.
 635 **III.**—W. R. ABBEY & SON, Croft Farm, Hessay, York.
 639 **V.**—J. H. BAKER & SON, Windyash, Barnstaple.
 643 **R. N.**—MR. AND MRS. ALFRED SCHURHOFF, Oldwych House, Chadwick End, Knowle, Warwickshire.
H. C.—633, 636. **C.**—631.

Class 479.—Utility Poultry. Sussex Cocks or Cockerels, any colour.

- 650 **I.**—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 649 **II.**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 646 **III.**—COL. D. A. CHAYTOR, Pooley Hall, Polesworth, Tamworth.
 645 **R. N.**—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
H. C.—647, 651.

Class 480.—Utility Poultry. Sussex Hens or Pullets, any colour.

- 655 **I.**—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe.
 654 **II.**—SIR GOMER BERRY, BART., Pendley Stock Farms, Tring.
 657 **III.**—JOHN A. DEWAR, Homestall P.F., East Grinstead.
 656 **R. N.**—COL. D. A. CHAYTOR, Pooley Hall, Polesworth, Tamworth.
H. C.—653.

Class 481.—Utility Poultry. Cocks, any other variety.

- 661 **I.**—W. W. W. BUTT, Eastfield P.F., North Thoresby, Lincs. Plymouth Rock.
 659 **II.**—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe. Minorca.
 658 **III.**—LADY BURKE, Henley Pedigree P.F., Henley-on-Thames. Australorp.
 660 **R. N.**—A. & W. SHEPHERD, Marton, Rugby. Plymouth Rock.

Class 482.—Utility Poultry. Hens, any other variety.

- 666 **I.**—THE REV. J. E. T. HUGHES, Radford Vicarage, Leamington Spa. Barnevelder.
 664 **II.**—COL. HUMPHREY WATTS, O.B.E., Haslington Hall, Crewe. Minorca.
 667 **III.**—R. S. MARSDEN, Chatburn, Clitheroe. Bresse.
 665 **R. N.**—W. H. MITCHELL, Elmdeane, Kenilworth. Croad Langshan.
H. C.—662, 668. **C.**—669.

Class 483.—Utility Poultry. Cockerels, any other variety.

- 671 **I.**—W. R. ABBEY & SON, Croft Farm, Hessay, York. Plymouth Rock.
 673 **II.**—JOHN TAYLOR, Heath Farm, Tiptree. Plymouth Rock.
 670 **III.**—J. H. BAKER & SON, Windyash, Barnstaple. Ancona.

Class 484.—Utility Poultry. Pullets, any other variety.

- 674 **I.**—JOHN TAYLOR, Heath Farm, Tiptree. Plymouth Rock.
 676 **II.**—W. R. ABBEY & SON, Croft Farm, Hessay, York. Plymouth Rock.
 675 **III.**—LADY BURKE, Henley Pedigree P.F., Henley-on-Thames. Australorp.

Class 485.—Aylesbury, Pekin or Rouen Drakes.

[No Entries.]

Class 486.—Aylesbury, Pekin or Rouen Ducks.

- 678 **I.**—S. SPINKE, Park Farm, Stowting, Ashford, Kent. Rouen.
 680 **II.**—ABBOT BROS., Thuxton, Norfolk. Rouen.
 677 **III.**—CAPT. D. P. LITGOW, South Newington Manor, Banbury. Aylesbury.
 679 **R. N.**—MISS P. M. EUREN, Hales Farm, Mundon, Chelmsford. Aylesbury.

Class 487.—Indian Runner Drakes or Ducks, any colour, bred prior to 1931.

- 686 **I.**—ABBOT BROS., Thuxton, Norfolk.
 681 **II.**—CAPT. GEORGE O'S. CREE, Overmoline, near Dorchester.
 684 **III.**—H. WHITLEY, Primley, Paignton.
 682 **R. N.**—FRED ARGO, Bructor, by Inverurie.
H. C.—685.

Class 488.—Indian Runner Drakes or Ducks, any colour, bred in 1931.

- 693 **I.**—THE REV. J. HEWETSON, Burbage Vicarage, Buxton.
 689 **II.**—FRED ARGO, Bructor, by Inverurie.

- 696 III.—W. J. HEWITT, Littlethorpe, Ripon.
 699 R. N.—H. WHITLEY, Primley, Paignton.
 H. C.—492.

Class 489.—Khaki Campbell Drakes.

- 698 I.—JOHN H. BUTLER, Gatecombe, Flax Bourton, Bristol.

Class 490.—Khaki Campbell Ducks.

- 699 I. and 701 II.—JOHN H. BUTLER, Gatecombe, Flax Bourton, Bristol.

Class 491.—Drakes, any other variety.

- 705 I.—ABBOT BROS., Thuxton, Norfolk. Muscovy.
 702 II.—A. J. MAJOR, Ditton, Langley, Bucks. Muscovy.
 707 III.—WM. RICHARDSON, 40, Bootham Crescent, York. Cayuga.
 706 R. N.—R. BARKER, Lodge P.F., Long Eaton, Nottingham. Magpie.
 H. C.—709.

Class 492.—Ducks, any other variety.

- 713 I.—CAPT. THE HON. C. K. GREENWAY, Stanbridge Earls P.F., Romsey, Hants. Stanbridge White.
 712 II.—WM. RICHARDSON, 40, Bootham Crescent, York. Cayuga.
 714 III.—R. BARKER, Lodge P.F., Long Eaton, Nottingham. Magpie.
 715 R. N.—MRS. G. M. SOAMES, Long Buckby Wharf, Rugby. Muscovy.
 H. C.—710.

Class 493.—Emden Ganders or Geese.

- 720 I.—R. DURRANT IVES, Erpingham, Norwich.
 721 II.—ABBOT BROS., Thuxton, Norfolk.
 719 III.—BROGYNTYN ESTATE CO., Brogyntyn, Oswestry.
 718 R. N.—CAPT. N. MILNE-HARROP, Garthgynan, Ruthin.
 H. C.—722.

Class 494.—Toulouse Ganders or Geese.

- 724 I.—G. H. BARKER, Thorpe Arnold, Melton Mowbray.
 726 II.—ABBOT BROS., Thuxton, Norfolk.
 725 III.—H. WHITLEY, Primley, Paignton.

Class 495.—Turkey Cocks.

- 727 I.—ABBOT BROS., Thuxton, Norfolk.
 732 II.—F. FARE, Fir Tree Farm, Crossmoor, Kirkham.
 731 III.—H. J. CATTELL, Church Farm, Brickenhill, Birmingham.
 735 IV.—H. WHITLEY, Primley Farm, Paignton.
 730 R. N.—MRS. S. BATEMAN, Sherbourne House, Allesley, Coventry.
 H. C.—734.

Class 496.—Turkey Hens.

- 740 I.—F. FARE, Fir Tree Farm, Crossmoor, Kirkham.
 741 II.—ABBOT BROS., Thuxton, Norfolk.
 736 III.—H. J. CATTELL, Church Farm, Brickenhill, Birmingham.
 739 R. N.—MRS. S. BATEMAN, Sherbourne House, Allesley, Coventry.

FARM AND DAIRY PRODUCE OF THE UNITED KINGDOM.

Butter.

Class 497.—Two pounds of Fresh Butter, without any salt, made up in plain pounds, from the milk of Channel Island, Devon or South Devon Cattle and their crosses.

- 4 I. (24.)—MRS. A. G. DENNIS, Fulworthy, Highampton, Beaworthy.
 2 II. (82.)—MRS. G. BLACKLER, West Leigh, Modbury.
 1 III. (81.)—HIS MAJESTY THE KING, Sandringham, Norfolk.
 14 IV. (106.)—MRS. JOHN WAX, West Bridge, Bishop's Nympton.
 12 V. (56.)—JOHN NORTHCOTT, Colalggett, Bodmin.
 11 R. N.—J. FIREPONT MORGAN, Wall Hall, Welford.
 H. C.—10. C.—5, 6.

Class 506.—Two Lancashire Cheeses, not less than 30 lb. each.

- 100 I. (25).—MARK PROCTER, Ashby Hall, Longridge, Preston.
 96 II. (23).—WILLIAM METCALF, Bolton Fold Farm, Alston, Preston.
 99 III. (22).—G. H. PRESTON, Beach House Farm, Warton, Preston.
 97 IV. (10a).—MATTHEW PARKINSON, Moss Farm, Salwick, Preston.
 94 R. N.—WILLIAM DUCKWORTH, Ribby Hall, Kirkham.

Class 507.—Two Gloucestershire Cheeses.

- 103 I. (25).—MRS. W. HAINE, Rectory Farm, Slimbridge, Glos.
 102 II. (23).—CHEDDAR VALLEY DAIRY CO., LTD., Rookbridge, Axbridge.
 104 III. (22).—ROBERT A. PERRY, Bushley Park, Tewkesbury.

Class 508.—Two Leicestershire Cheeses.

- 108 I. (25).—P. J. HAYNES, Home Farm, Ashton Parva, Rugby.
 110 II. (23).—FRANCIS W. TOMLINSON, Hall Farm, Ullesthorpe, Rugby.
 109 III. (22).—HERBERT RICHARDSON, The Orchards, Cotesbach, Rugby.

Class 509.—Two Stilton Cheeses.

- 118 I. (25).—WILTS UNITED DAIRIES, LTD., Harby, Melton Mowbray.
 113 II. (23).—LONG CLAWSON DAIRY, LTD., Long Clawson, Melton Mowbray.
 112 III. (22).—EMBERLIN & CO., LTD., The Dairy, Wymeswold, Loughborough.
 111 IV. (10a).—EMBERLIN & CO., LTD., The Dairy, Old Dalby, Melton Mowbray.
 114 R. N.—J. W. NUTTALL & CO., LTD., Dove Dairy, Hartington, Buxton.

Class 510.—Two Wensleydale Cheeses, Stilton shape.

- 120 I. (25).—MISS RACHEL JAMES, Llancafo, Usk.
 121 II. (23).—MISS B. J. MUDD, Aldborough Dairy, Boroughbridge.

Class 511.—Two Caerphilly Cheeses.

- 128 I. (25).—MISS RACHEL JAMES, Llancafo, Usk.
 124 II. (23).—CHEDDAR VALLEY DAIRY CO., LTD., Rookbridge, Axbridge.
 130 III. (22).—JENKIN JONES, Cwm, Crickhowell.
 132 IV. (10a).—MRS. A. PHILIPS, Ruthin Farm, Pencoed, Bridgend.
 133 R. N.—THOMAS WILKINS, Putnell Farm, Cannington, Bridgwater.
 H. C.—125.

Class 512.—Two Small Cheeses, not exceeding 6 lb. each, of Cheddar or Cheshire character.

- 137 I. (24).—MRS. S. A. HARRIS, Nantyderri, Abergavenny.
 134 II. (22).—GEORGE BARNES, Hatherleigh, Wincanton.
 142 III. (21).—H. S. & W. G. WHITTAKER, Wardle Bridge Farm, Nantwich.
 140 IV. (10a).—FRANK PORTER, Leigh Farm, Wincanton.
 136 R. N.—E. A. COOKSON, Minshull Hall, Middlewich.

Class 513.—Two Small Cheeses, not exceeding 6 lb. each, of Stilton or Wensleydale character.

- 147 I. (24).—THE MISSES M. F. & J. WEBSTER, Saxelbye, Melton Mowbray.
 146 II. (22).—J. M. NUTTALL & CO., LTD., Dove Dairy, Hartington, Buxton.
 144 R. N.—MRS. S. A. HARRIS, Nantyderri, Abergavenny.

Class 514.—Two Soft Cheeses made from whole milk.

- 149 I. (24).—MISS E. HADES, Ullesthorpe, Rugby.
 154 II. (22).—FRANCIS W. TOMLINSON, Hall Farm, Ullesthorpe, Rugby.
 148 III. (21).—BERRIDGE BROS., The Common, Sawtry, Peterborough.
 153 R. N.—MRS. J. W. PANTALL, Lilac Home Prize Products, Hereford.

Class 515.—Two Cheeses made from cream, without the addition of rennet.

- 155 I. (24).—HIS MAJESTY THE KING, Sandringham, Norfolk.
 161 II. (22).—JENKIN JONES, Cwm, Crickhowell.
 159 III. (21).—MRS. H. HUNT, Little Yew Ground Farm, Chipping Norton.
 156 IV. (10a).—MAJOR A. D. C. CLARKE, D.S.O., M.C., Walton Farm, Wellesbourne, Warwick.
 163 R. N.—MRS. J. W. PANTALL, Lilac Home Prize Products, Hereford.

Cider.

Class 516.—Casks of Cider, not less than 6 gallons, made in 1930 by a bona-fide Farmer.

- 165 I. (23), and 164 III. (21).—H. W. DAVIS, Goldsborough Farm, Sutton Montis, Yeovil.
 167 II. (22).—STANLEY J. SHEPPY, Three Bridges, Bradford, Taunton.

Class 517.—Six Bottles of Dry Cider, made in 1930.

- 172 I. (23).—ANDREW FORD, White House, Newent, Glos.
 173 II. (22).—MITCHELL TOMS & CO., LTD., Chard.
 189 III. (21).—SIR JOHN AMORY, BART., Knights Hayes Court, Tiverton.
 171 E. N.—H. W. DAVIS, Goldsborough Farm, Sutton Montis, Yeovil.

Class 518.—Six Bottles of Sweet Cider, made in 1930.

- 181 I. (23).—MITCHELL TOMS & CO., LTD., Chard.
 175 II. (22), and 176 E. N.—SIR JOHN AMORY, BART., Knights Hayes Court, Tiverton.
 179 III. (21).—H. W. DAVIS, Goldsborough Farm, Sutton Montis, Yeovil.
 182 IV. (10s.).—QUANTOCK VALE CIDER CO., LTD., North Petherton, Bridgwater.
 C.—177.

Class 519.—Six Bottles of Cider, made previous to 1930.

- 193 I. (23), and 193 III. (21).—SEVERN VALE CIDER CO., LTD., Bushley, Tewkesbury.
 191 II. (22).—ANDREW FORD, White House, Newent, Glos.

Wool.¹

Of 1931 clip.

First Prize, 23; Second Prize, 22; Third Prize, 21, in each Class.

Class 520.—Three Fleeces of Oxford Down Wool.

- 195 I. and 194 II.—H. W. STILGEE, The Grounds, Adderbury, Banbury.

Class 521.—Three Fleeces of Shropshire Wool.

- 196 I. & Champion.²—JOHN MINTON, Dryton, Wroxeter, Shrewsbury.
 199 II. and 198 III.—E. CRAIG TANNER, Eytton-on-Severn, Wroxeter, Shrewsbury.

Class 522.—Three Fleeces of Southdown Wool.

- 203 I.—LADY LUDLOW, Luton Hoo, Luton.
 201 II.—HIS MAJESTY THE KING, Sandringham, Norfolk.
 205 III.—J. PIERPONT MORGAN, Wall Hall, Watford.

Class 523.—Three Fleeces of Hampshire Down Wool.

- 207 I.—WILLIAM TODD, Little Ponton Grange, Grantham.

Class 524.—Three Fleeces of Suffolk Wool.

- 209 I. and 210 II.—MAJ.-GEN. LORD TROWEN, C.B., C.M.G., Llanover, Abergavenny.

Class 525.—Three Fleeces of Dorset Down Wool.

- 212 I. and 213 II.—LEONARD TORY, Turnworth, Blandford.

Class 526.—Three Fleeces of Dorset Horn Wool.

- 214 I. and 215 II.—ALFRED READ, Lower Farm, Hilton, Blandford.

Class 527.—Three Fleeces of Ryeland Wool.

- 217 I. & R. N. for Champion,² and 216 II.—DAVID J. THOMAS, Monachty, Abergavenny.

Class 528.—Three Fleeces of Kerry Hill (Wales) Wool.

- 218 I.—JOHN T. BRAVAN, Winsbury, Chirbury, Montgomery.
 220 II. and 219 III.—SIR DAVID R. LLEWELLYN, BART., The Court, St. Fagans, Cardiff.

Class 529.—Three Fleeces of Lincoln Wool.

- 224 I.—MAJOR W. H. RAWNSLEY, Well Vale, Alford, Lincs.
 222 II. and 221 III.—J. W. LEFT, Scagglethorpe Manor, Malton.

Class 530.—Three Fleeces of Border Leicester Wool.

[No Entries.]

¹ The Second and Third Prizes in these Classes were given by the respective Flock Book Societies.

² Special Cash Prize, known as the "Merchants of the Staple of England" Prize, given for the best fleece taken from any short-woolled breed of sheep.

Awards of Prizes for Butter-Making at Warwick, 1931. olv

Class 531.—Three Fleeces of Wensleydale Wool.

- 225 I. & Champion.¹—JOHN W. GREENSIT, Holme-on-Swale, Thirsk.
227 II.—W. H. O. PICK, Woodhill Grange, Thirsk.

Class 532.—Three Fleeces of Kent or Romney Marsh Wool from Rams of any age.

- 233 I.—ASHLEY STEVENS, Davington Hall, Faversham.
232 II.—J. EGBERTON QUESTED, The Firs, Cheriton, Kent.
230 III.—L. H. & G. W. FINN, The Mall, Faversham.

Class 533.—Three Fleeces of Kent or Romney Marsh Wool, from Ewe Tegs.

- 239 I. & R. N. for Champion.¹—ASHLEY STEVENS, Davington Hall, Faversham.
232 II.—E. W. BAKER, Farsonage Farm, Bekebourne, Canterbury.
235 III.—L. H. & G. W. FINN, The Mall, Faversham.

Class 534.—Three Fleeces of Kent or Romney Marsh Wool, excluding Rams or Ewe Tegs.

- 241 I.—L. H. & G. W. FINN, The Mall, Faversham.
245 II.—J. EGBERTON QUESTED, The Firs, Cheriton, Kent.
246 III.—ASHLEY STEVENS, Davington Hall, Faversham.

Class 535.—Three Fleeces of Welsh Mountain Wool.

- 248 I.—J. K. WILLIAMSON, Derwen Hall, Corwen.
247 II.—UNIVERSITY COLLEGE OF NORTH WALES, College Farm, Aber, Caernarvonshire.

Class 536.—Three Fleeces of Black Welsh Mountain Wool.

- 249 I. and 250 III.—MISS J. V. HORN, Woodcote Park, Blackshields, Midlothian.
251 II.—MAJ.-GEN. LORD TREOWEN, C.B., C.M.G., Llanover, Abergavenny.

BUTTER-MAKING COMPETITIONS.

Class 1.—Open to Students who have attended a course at the Studley College for Women, and who have not won a First or Second Prize at any Show.

- 23 I. (24).—MISS MARGARET WATSON, Spring Lodge, Barnard Castle.
22 II. (23).—MISS BETTY TURTLE, Froyz Hall, Halstead.
9 III. (22).—MISS SHEELAGH HAY, Kimpton Lodge, Andover.
1 IV. (21).—MISS MARY ELIZABETH AROHER, Studley College, Warwickshire.
7 R. N.—MISS E. MONA ELLIS, Studley College, Warwickshire.
H. C.—3, 20. C.—8, 15.

Class 2.—Open to Students who have attended a course at any County Class organized by the Warwickshire and Worcestershire County Councils, and who have not won a First or Second Prize at any Show.

- 32 I. (24).—MISS DOROTHY SMITH, The Hermitage, Wadborough, Worcester.
25 II. (23).—MISS MARY EWINS, Radford, Inkberrow, Worcester.
27 III. (22).—MRS. E. GWENDOLINE GRIFFITHS, Spellis Farm, Hindlip, Worcester.
24 IV. (21).—MISS MYRA BETTS, New House Farm, Himbleton, Droitwich.
29 R. N.—MISS MARY A. HEWLETT, Ingle Nook, Holberrow Green, Astwood Bank, Redditch.
H. C.—30. C.—26.

Class 3.—Open to Students who have received not less than one month's instruction at any Dairy School and who have not won a First or Second Prize at the R.A.S.E., London Dairy, Bath & West, Royal Counties, Royal Lancashire or Yorkshire Shows.

Section A.

- 47 I. (24).—MISS ELSIE EVANS, Monmouthshire Agricultural Institution, Usk.
56 II. (23).—MISS NANCY HUGHES, Monmouthshire Agricultural Institution, Usk.
60 III. (22).—MISS OLIVE M. JONES, The Steps, Clifton-on-Teme, Worcester.
34 IV. (21).—MISS DOROTHY ABELL, White House, Little Cowarne, Pencombe, Hereford.
55 R. N.—MRS. J. HILL, Bramston, Oakham.
H. C.—36, 59. C.—42, 54.

¹ Special Cash Prize, known as the "Merchants of the Staple of England" Prize, given for the best fleece taken from any long-woolled breed of sheep.

clvi *Awards of Horticultural Prizes at Warwick, 1931.*

Section B.

- 64 I. (#4).—MISS C. M. LEE, Bath Arms Hotel, Minsterley, Shropshire.
 69 II. (#2).—MISS KATHLEEN IRENE MARSHALL, Grafton Flyford, Worcester.
 76 III. (#2).—MISS E. E. PETERS, Tremminheene, Stithians, Perranwell.
 70 IV. (#1).—MISS GWENDOLINE D. MATTHEWS, Powers Farm, Bridstow, Ross-on-Wye.
 71 E. N.—MISS HAZEL M. MILES, Edenwall Farm, Coleford.
 E. C.—62. C.—67, 85, 88.

Class 4.—*Open, except to Champions at the R.A.S.E., London Dairy, Bath and West, Royal Counties, Royal Lancashire or Yorkshire Shows.*

Section A.

- 105 I. (#5).—MISS ROSA HANCOCK, New Barn, Chulmleigh, Devon.
 99 II. (#4).—MISS FLORENCE M. COOKE, 30, Howard Street, Gloucester.
 99 III. (#3).—MISS GRACE MARY CULLEN, Lower Court, Cotheridge, Worcester.
 112 IV. (#2).—MISS SYBIL E. JONES, Cwm, Crickhowell.
 113 V. (#1).—MISS MARIE JULIAN, Tredinnick, Duloe, Cornwall.
 114 E. N.—MISS C. M. LEE, Bath Arms Hotel, Minsterley, Shropshire.
 E. C.—104. C.—103, 106, 108.

Section B.

- 126 I. (#5).—MISS E. E. PETERS, Tremminheene, Stithians, Perranwell.
 120 II. (#4).—MISS H. E. MITCHELL, Penventinle, Kenwyn, Truro.
 132 III. (#3).—MISS SIDWELL M. STEPHENS, St. Winnow Barton, Lostwithiel.
 129 IV. (#2).—MISS F. G. M. SEYMOUR, Pool Mill, Bridstow, Ross-on-Wye.
 118 V. (#1).—MISS KATHLEEN IRENE MARSHALL, Grafton Flyford, Worcester.
 131 E. N.—MISS NORA E. SPENCER, Brook House, Broadwas-on-Teme, Worcester.
 E. C.—122. C.—127.

Class 5.—*Inter-County Championship for teams of three, one of whom must be a Novice never having won a First or Second Prize up to the time of entry, the second member must not have won more than three First Prizes and must never have won any Championship, the third member may be a Champion at this or any Show.*

- 146 I. (#3, & Silver Medal each).—{ MISS MARY LUMLEY,
 MISS JEAN INGHAM, } Lancs C.C. Farm,
 MISS M. B. ASSELEY, } Hutton, Preston.
 147 II. (#2 each).—{ MISS LORRAINE AYE, Higher Ash Town, Rose Ash, Barnstaple.
 MRS. J. MOGFORD, Overcott, Rose Ash, Barnstaple.
 MISS ROSA HANCOCK, New Barn, Chulmleigh, Devon.
 148 III. (#1 each).—{ MISS MARIE JULIAN, Tredinnick, Duloe, Cornwall.
 MISS SIDWELL M. STEPHENS, St. Winnow Barton, Lostwithiel.
 MISS HILDA E. MITCHELL, Penventinle, Kenwyn, Truro.
 143 E. N.—{ MISS DOROTHY SMITH, The Hermitage, Wadborough, Worcester.
 MISS PHYLLIS PEER, Rectory Farm, Tibberton, Droitwich.
 MISS MABEL K. STRATTON, Charlton, Pershore.

Class 6.—*Championship open to First Prize Winners in the preceding Classes and to First Prize Winners at the R.A.S.E., London Dairy, Bath and West, or any County Show.*

- 164 I. (#5, & Gold Medal).—MISS MABEL ROUNSEVELL, The Dairy, Hursley Park, Winchester
 152 II. (#4).—MISS ROSA HANCOCK, New Barn, Chulmleigh, Devon.
 126 III. (#3).—MISS E. E. PETERS, Tremminheene, Stithians, Perranwell.
 146 IV. (#2).—MISS MARY LUMLEY, Lancs C.C. Farm, Hutton, Preston.
 154 V. (#1).—MISS JEAN HARGREAVE INGHAM, Lancs C.C. Farm, Hutton, Preston.
 159 E. N.—MISS H. E. MITCHELL, Penventinle, Kenwyn, Truro.

FLOWER SHOW.

Class 1.—Groups of Miscellaneous Plants.

- 1 I. (#45).—JAMES CYPRER & SONS, Queen's Road Nurseries, Cheltenham.
 2 II. (#40).—T. M. PEACE, Highfield Nursery, Great Horton, Bradford.

Class 2.—Collection of Delphiniums.

- 3 I. (#8).—BLACKMORE & LANGDON, Bath.

Awards of Horticultural Prizes at Warwick, 1931. civii

Class 3.—Groups of Tuberous Begonias in pots.

- 4 I. (£30).—BLACKMORE & LANGDON, Bath.

Class 4.—Groups of Aquatic Plants.

- 8 I. (£20).—C. H. TANDEVIN, LTD., Baby Flower Farm, Willaston, Wirral, Cheshire.
7 II. (£15).—M. PRICHARD & SONS, LTD., Riverslea Nurseries, Christchurch, Hants.
6 III. (£10).—P. GARDNER, Craven Nurseries, Addingham, Ilkley.
5 IV. (£5).—BOWELL & SKARRATT, Hardy Plant Nurseries, Cheltenham.

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4. The Medal shall be adjudged by referees appointed by the Council of the Royal Agricultural Society.

5. The Monograph or Essay shall be forwarded to the Secretary of the Royal Agricultural Society *on or before SEPTEMBER 29th, 1932*. The Monograph or Essay shall be typewritten or printed.

6. If, in the opinion of the Referees, no Monograph or Essay be found to attain a sufficient standard of excellence, they shall be at liberty to reserve the Medal of that year for award as an additional Medal in some subsequent year.

7. The Monograph or Essay of the successful candidate shall be published in the Journal of the Royal Agricultural Society, if, in the opinion of the Council, it is suitable for that purpose. Essays already published shall not be eligible for the Medal.

